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First record of the cob-web spider *Platnickina adamsoni* (Berland, 1934) from Ascension Island (Araneae: Theridiidae)

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Abstract

Platnickina adamsoni (Berland, 1934) is recorded from Ascension Island for the first time, based on an examined adult female, collected by vegetation beating. The complex taxonomic history of *P. adamsoni* is discussed, to contextualize the significance of this record, which may have been misidentified as a similar congener – *Platnickina mneon* (Bösenberg & Strand, 1906) – if not for recent corrections to the literature by Dupérré (2023).

Keywords: non-native, distribution, morphology.

Introduction

Ascension Island is one of the most remote inhabited islands in the world, located in the South Atlantic Ocean and hosts many interesting invertebrate species (Ashmole & Ashmole, 2000). Hitherto, its spider fauna has been depauperate of theridiids, with only the cosmopolitan *Latrodectus geometricus* C.L. Koch, 1841, *Parasteatoda tepidariorum* (C.L. Koch, 1841), and *Steatoda grossa* (C.L. Koch, 1838) known (Duffey, 1964; Ashmole & Ashmole, 2000). Recently, whilst sorting spiders from vegetation beating performed by the second author, the senior author discovered an adult female of *Platnickina adamsoni* (Berland, 1934). Thus, in this work we formally record this species from Ascension Island. However, before this it is important to discuss the complete

taxonomic history of this species, which for twenty years was often confused with another *Platnickina* species.

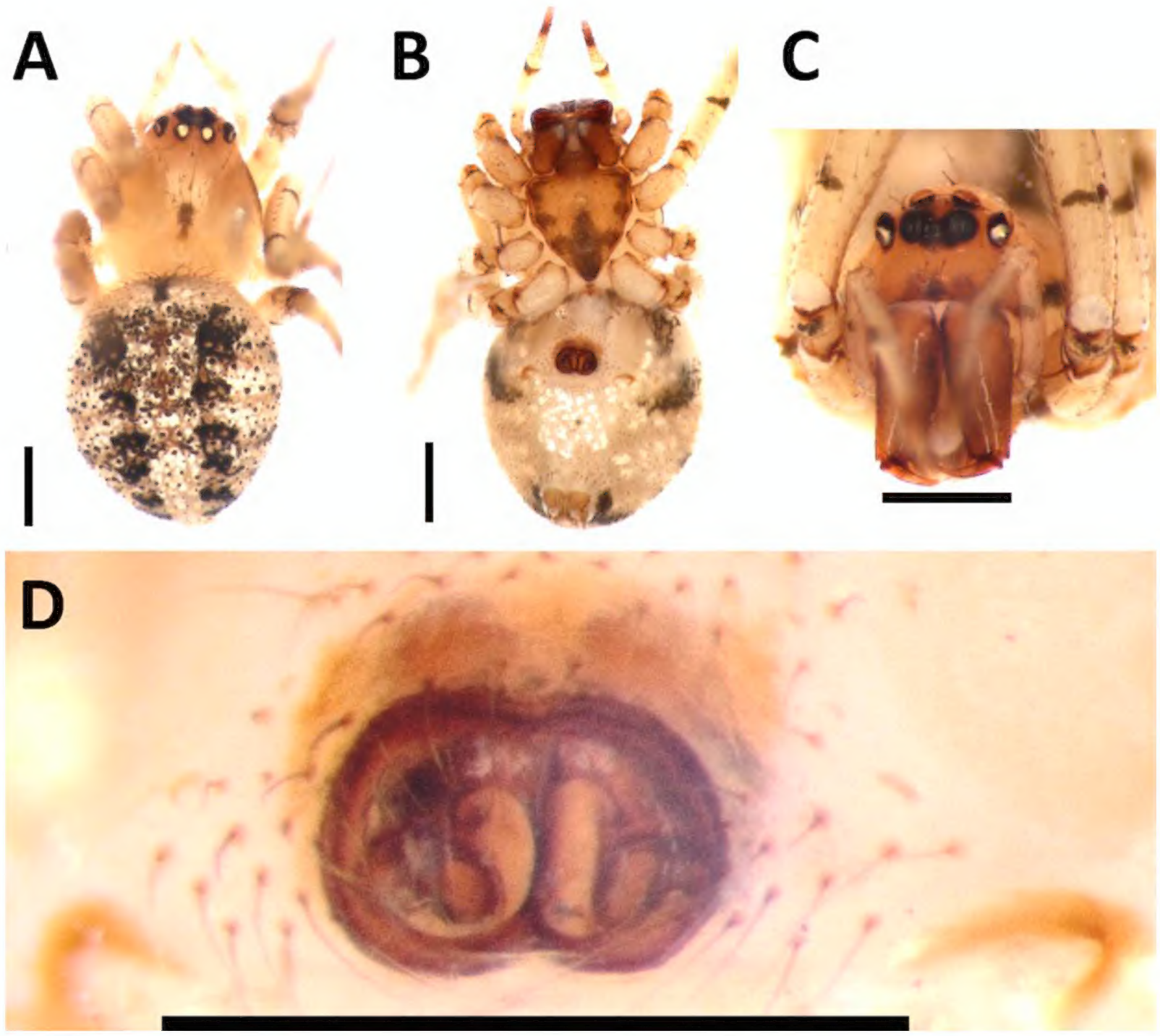

Fig. 1. *Platnickina adamsoni* (Berland, 1934) adult female (ASC L16 1 VB) found on Ascension Island. A-B. habitus. A. dorsal view. B. ventral view. C. eyes and chelicerae, frontal view. D. epigyne, ventral view. (Scale bars: 1 mm). Photo credits: Danniella Sherwood.

Berland (1934) described *Theridion adamsoni* Berland, 1934 based only on the female. It remained without further taxonomic comment until Levi (1959) treated *Theridion hobbsi* Gertsch & Archer, 1942 as its junior synonym, thereby also transferring several other names under *T. adamsoni* which were previously synonymised with *T. hobbsi* (namely: *T. blatchleyi* Bryant, 1945, *T. insulicola* Bryant, 1947 and *Chindellum magnificum* Archer, 1950) and rendering this taxon as known from both sexes. Following Levi's work, the validity of *T. adamsoni* was never questioned by any works figuring the genitalia of this species (see references on World Spider Catalog, 2023). With the exception of Saaristo (1978), who considered this species in *Coleosoma* O. Pickard-Cambridge, 1882, all the aforementioned authors treated this species as belonging to *Theridion* Walckenaer, 1805.

Yoshida (2001) synonymised *T. adamsoni* with the newly combined *Keijia mneon* (Bösenberg & Strand, 1906), stating: "Although *Theridion adamsoni* Berland, 1934 has been known from Japan, China, North America, and temperate and tropical area of the

world, I consider that *Th. mneon* Bösenberg & Strand 1906 described from Japan is conspecific to *Th. adamsoni* ...". Namkung (2002) listed the real (see below) *T. adamsoni* in its prior combination. Saaristo (2010) considered *K. mneon* (and what we now know subsequently were misidentified illustrations of *P. adamsoni*, then still a junior synonym) in the genus *Platnickina* Koçak & Kemal, 2008 and one year later, Ono (2011) rejected the synonymy of *P. mneon* and *P. adamsoni*, revalidating the latter.

It is clear that these two species are closely related, this was further demonstrated by Dupérré (2023) who found nine works which figured misidentified specimens of *P. adamsoni* as *P. mneon* (see references on World Spider Catalog, 2023). *Platnickina adamsoni* is recognisable based on the two sclerotised plates on the epigyne, which house the copulatory openings, and the oval shape of the spermathecal receptacles (Dupérré, 2023). Hitherto, *P. adamsoni* (often misidentified as *P. mneon*) has been recorded from Asia (China, Korea, Japan), the Americas (parts of North and South America, and the Caribbean), and Africa (Ghana, the Seychelles, and South Africa) (World Spider Catalog, 2023).

On 21st February 2022, the second author performed beating of non-native guava *Psidium guajava* and Bermuda pine *Juniperus bermudiana* at the Devil's Cauldron, on the northeast part of Ascension. The spiders from these samples were sent to the senior author for identification. In one tube (ASC L16 1 VB), a single adult female of *P. adamsoni* was found, representing the first formal record of this species and genus from Ascension Island. Unfortunately, this adds yet another non-native species to the list of Ascension's spiders, which is almost entirely comprised of such taxa (Ashmole & Ashmole, 2000).

Nonetheless, it is important to update the list and understand what new non-native species may continue to establish on the island. The specimen is held in the Ascension Island Conservation invertebrate collection, Georgetown; it is intended in the future that the ASC collection will be donated and moved to the Saint Helena National Trust, Jamestown, Saint Helena.

This work was made possible by funding to the senior author through the Darwin Plus grant DPLUS135: "From pseudoscorpions to crickets: securing Ascensions Island's unique invertebrates", funded by the Darwin Plus Initiative, United Kingdom Government, and administered by Ascension Island Government and supported by the Species Recovery Trust.

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Uloborus danolius Tikader, 1969 is a junior synonym of *Zosis geniculata* (Olivier, 1789) (Araneae: Uloboridae)

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Abstract

Many species described in the past have lacked a complete description a thing that led to misidentification and to describe the already described species as new species. A detailed analysis of the Indian spider species *Uloborus danolius* resulted in the synonymization with *Zosis geniculata* because of its misidentification.

Keywords: Synonymy, Uloboridae, *Zosis*, morphology, taxonomy, synanthropic spider. India.

Introduction

Uloboridae is a cosmopolitan family which contains 19 genera and 287 species across the globe (World Spider Catalog, 2023). Though this family is represented throughout the world, it only achieves its greatest diversity of species and genera in tropical and sub-tropical zones. The first uloborid was described by Olivier (1789), placing it into Linnaeus' genus *Aranea*. The genus *Uloborus* was erected by Latreille (1806) and was allied with Araneidae. In 1870, O. Pickard-Cambridge established the family Uloborides for the genera *Hyptiotes* and *Uloborus* and described the new genus *Miagrammopes*. Simon (1874) combined them to form Uloboridae and later he extended this family to include other subfamilies (Simon, 1892). A historical review of higher-level spider classification of Uloboridae was presented by Bristowe (1938), Bonnet (1959), and Lehtinen (1967). The uloborid species are small to medium sized (3-10 mm), cribellate, entelegyne spiders with variable carapace. They typically lack poison glands unlike most other spider species. Members of the family Uloboridae possess six

potentially synapomorphic characters: 1. loss of poison glands, 2. presence of a ventral row of macrosetae on the fourth metatarsi and tarsi, 3. two apical cymbial setae on the male palpus, 4. production of an orb-web or web derived from an orb, 5. presence of a row of trichobothria on the second through fourth femora, and 6. stout tracheal trunks which extend into the cephalothorax (Opell, 1979).

Benoy Krishna Tikader (1928-1994) was a great visionary who paved a crucial path in Indian arachnology, describing many twentieth century spider taxa from various parts of the Indian sub-continent. He published the *Handbook of Indian Spiders* in 1987, which describes 40 families and 1066 species of India, many of which were described by himself (Tikader, 1987). In addition to being a pioneer in Indian Arachnology, he extended his scientific curiosity in identifying and describing species of organisms other than spiders during his period of work in Zoological Survey of India. However, many of his descriptions were short, lacked explanatory illustrations, and were obvious synonyms of species he had already described, or species described by others. Many works in recent years have clarified the identity of Indian spiders described by Tikader, but there are still some spider species which remain in their original nomenclature, without modern redescription or assessment.

In this study, based on collections and literature review, we discuss and state the synonymy between *Uloborus danolius* (Tikader, 1969) and *Zosis geniculata* (Olivier, 1789) which has not been noted before. We also discuss the problematic aspects of short and insufficient description of a species that creates unsurmountable ambiguity in the field of taxonomy. Although Tikader's contribution to the scope of spider taxonomy, even in the period of lesser technological advancement, is incomparable, often his descriptions prove inadequate in the process of identifying a spider. In that matter, Gajbe's (1991, 1993, 2004, 2007) description also fails to counteract the insufficiencies of his predecessor.

Material and Methods

The specimens (containing mostly both adult males and females) were collected using handpicking method and placed in collecting tubes of 70% ethanol with their complete collecting data. The collected specimens were examined under a stereo-zoom microscope (Leica M205C) and the digital images of male and female genitalia and habitus taken using Leica DMC 4500 digital camera attached to Leica M205C stereomicroscope, with a software package Leica Application Suite (LAS). Female genitalia were dissected and examined after clearing by KOH. The male palp was detached and carefully analysed. Examined specimens are deposited in the reference collection at the Centre for Animal Taxonomy and Ecology (CATE), Department of Zoology, Christ College, Irinjalakuda, Kerala, India.

Taxonomy

Uloboridae Thorell, 1869

Uloborus danolius Tikader, 1969 = ***Zosis geniculata*** (Olivier, 1789)

Uloborus danolius Tikader, 1969: 128, f. 6-9 (D♀).
Uloborus danolius Tikader & Biswas, 1981: 15, f. 8-11 (♀).
Uloborus danolius Gajbe, 1991: 307, f. 1-3 (D♂).
Zosis geniculatus Yoshida, 2009: 145, f. 8-11, 26-27 (♂♀).
Zosis geniculata Saaristo, 2010: 288, f. 40.32-41 (♂♀).
Zosis geniculata Sen *et al.*, 2015: 22, f. 29-33, pl. 12 (♀).

Justification of Synonymy

Uloborus danolius female was first described by Tikader (1969) followed by its male description by Gajbe (1991). The details about the holotype are unknown and of the paratypes are unclear. The comparative studies were based on the figures and the description made depending on them. This described species was never located from any part of the world other than India. Both the descriptions lack clarity in the details (Tikader, 1969: fig. 8; Gajbe, 1991: figs. 2-3), which is a necessity in spider identification. It was named under the genus *Uloborus*, although its description does not mention anything about cribellum, macrosetae or trichobothria, which are the distinguishing characters of its genus and family. Descriptions are completely based on the morphology of the spider, of which crucial morphological aspects are left out. The exact measurements provided them are rigid without the consideration of the reality of individual variation. A key identifying aspect in the identification of entelegyne spiders is the detailed account of its reproductive structures, *i.e.*, male palp and female epigyne. In case of female epigyne, Tikader (1969) has mentioned nothing in depth about the structure, but was generous enough to provide loose diagrams which actually led to pointing out the similarity with *Zosis* Walckenaer, 1841. On the other hand, Gajbe's (1991 - Fig. 3) diagram of male palp raise to be more ambiguous from reality.

From the vague description provided by Tikader (1969) and Gajbe (1991), the following morphological features of the species *Uloborus danolius* exactly matches with the species *Zosis geniculata* initially described by Olivier (1789). *U. danolius* and *Z. geniculata* have two conspicuous longitudinal deep brown broad patches on the cephalothorax with light lateral margins (Figs. 1 & 8). They have longer deep brown coloured sternum and have a deep brown band extending from epigastric fold (Figs. 2 & 9). Both of their females have an anterior median hump with small white patches on brown colour in a net-like manner on the abdomen (Fig. 10). These two species are mentioned to have banded legs with transverse black patches clothed with hairs and legs I and IV longer than II and III. Genus *Uloborus* has male palpus with small median apophysis with conductor, but *U. danolius* palp has a dome-shaped median apophysis bulb, and a claw-like median apophysis spur without a conductor, which is characteristic feature of genus *Zosis* (Figs. 4 & 5). The provided illustration of male palp by Gajbe (1991) fails to clearly depict an embolus with the conductor and the ventral view of *U. danolius* palp is greatly similar to the ventro-lateral view of *Z. geniculata* palp (Fig. 7). The female members of genus *Uloborus* have a tuft of hair of setae on distal region of first tibia and *U. danolius* definitely lack the mentioning of that characteristic feature, implying that it does not belong to genus *Uloborus*. The epigyne of *U. danolius* is so similar to *Z. geniculata* that it has two flattened, weakly sclerotized posterior lobes extending ventrally. The ventrolateral margins of the widely separated posterior lobes each have a triangular sclerite (Fig. 11). Posterior surface of each lobe forms an atrium at whose median margin an epigynal opening is located unlike the species of *Uloborus* which does not have a widely separated epigynal lobes to form an atrium (Fig. 13). The two crypts merge and are bordered by the ventral posterior plate border. Duct leading from each epigynal opening leads to a spherical spermatheca. The internal view of epigyne in Tikader's illustration resembles the posterior view of *Zosis* where the copulatory ducts that begins at each epigynal lobe running backwards to join spermatheca (Fig. 14). Clearly, *U. danolius* lack the features of *Uloborus* and shows great similarities with *Zosis*.

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Figs. 1-14. *Zosis geniculata* (Olivier, 1789). 1-7. Male. 8-14. Female. 1-3, 8-10. Habitus. 1,8. dorsal view. 2,9. ventral view. 3,10. lateral view. 4-7. ♂ palp. 4. prolateral view. 5. retrolateral view. 6. ventral view. 7. ventrolateral view. 11-14. ♀ epigyne. 11. ventral view. 12. internal view. 13. anterior view. 14. posterior view. (12-14. cleared).

Because of the presence of the above similarities, and also the absence of further description after Gajbe (1991), *U. danolius* can be synonymised with *Z. geniculata*. We can clearly state that *U. danolius* was misidentified and that this species is certainly *Zosis*

geniculata which is recorded from India (Sen *et al.*, 2015) and many other countries (World Spider Catalog, 2023).

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Dominance structure and guild composition of spider assemblages in the Purna Wildlife Sanctuary, Gujarat, India

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Abstract

Purna Wildlife Sanctuary is a protected area situated in the northern most tip of one of the hottest hotspots – Western Ghats. Knowledge of the biodiversity structure of such important areas is essential for conservation planning and management. Besides being an excellent indicator of species diversity and health of terrestrial ecosystems, spiders still remain almost a neglected group of animals in conservation point of view. Aim of this paper is to study the dominance structure and guild composition of spiders of Purna Wildlife Sanctuary, as these compositions indicate the quality of biodiversity of this protected area. Dominance structure was measured using Tischler's scale and guild structure analysis that was done based on ecological attributes of each spider family. Eudominant species in Purna Wildlife Sanctuary was found to be *Argiope pulchella* (Family Araneidae). Dominant guild was Orbweb weavers. This paper also attempts to update the spider diversity in Purna Wildlife Sanctuary.

Keywords: Araneae, Tischler's scale, ecological indicator, protected area, conservation.

Introduction

Purna Wildlife Sanctuary is a protected area located in the Western Ghats mountain range, a unique biodiversity hotspot in India. Tropical moist deciduous forests interspersed with Teak, Bamboo, and Catechu tree plantations enrich the sanctuary. Previous studies have reported threats like habitat loss and degradation in Purna Wildlife Sanctuary leading to local extinction of its fauna (Trivedi & Soni, 2006; ENVIS hub, Gujarat 2013). Comprehensive study of fauna of protected areas helps to furnish guidance for scientifically managing and planning conservation strategies for that area. Every so

often, we can find publications on various faunal groups from Purna Wildlife Sanctuary. Detailed works on: Mammals (Patel *et al.*, 2018; Patel *et al.*, 2020), Birds (Trivedi & Soni, 2006; Jambu, 2013; Patel *et al.*, 2015; Ayesha *et al.*, 2020), Herpetofauna (Siliwal *et al.*, 2003a; Vyas, 2007; Vyas & Desai, 2010), Fish (Banyal *et al.*, 2021), Insects (Rathod *et al.*, 2021), and Spiders (Siliwal *et al.*, 2003b) were published so far. Spiders were rarely used to assess the biodiversity of a protected area, even though they are one of the most abundant arthropoda orders. Feest & Cardoso (2012) have suggested spiders as a potential biodiversity quality indicator group in Portuguese protected areas. Dominant species plays an important role in maintaining the species diversity and functioning of an ecosystem. Therefore, the identity of dominant species is essential for developing conservation and management strategies. Aim of this study is to find the dominance structure and guild composition of spiders in Purna Wildlife Sanctuary and to provide an updated checklist of the same region.

Material and Methods

Study area

The study was carried out from November 2019 to March 2022 in Purna Wildlife Sanctuary, Gujarat, India. Situated in the northernmost tip of western Ghats in the Dangs district of Gujarat. Purna Wildlife Sanctuary sprawls over an area of 160.84 square kilometres and supports a rich diversity of fauna and flora. It was established in July 1990 and have the densest forest cover in the state of Gujarat. Type of forest prevalent here is moist deciduous forest. This protected area was named after river Purna which flows through the sanctuary. Purna Wildlife Sanctuary is located between 21°04'N, 73°39'E and 20°47'N, 73°41'E.

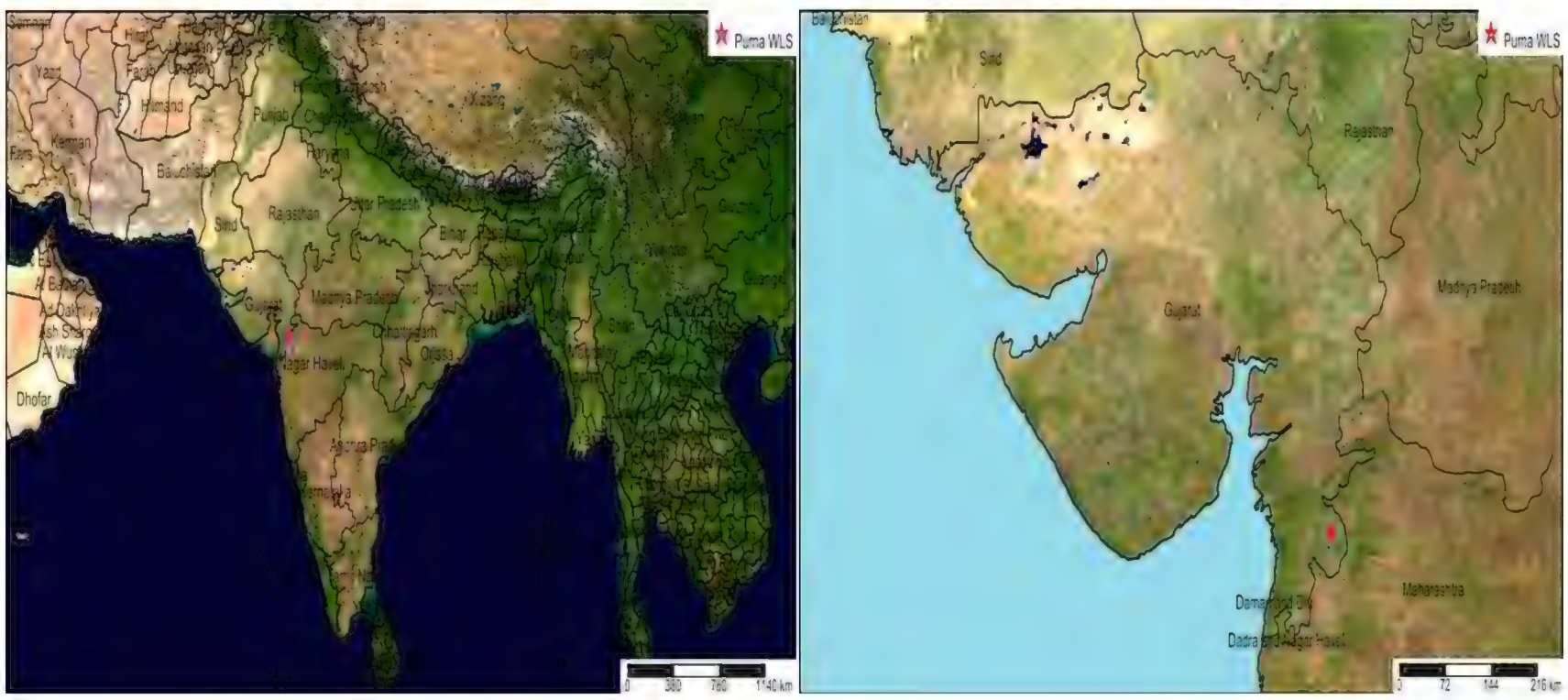

Fig. 1. Location map of the study area (Red asterisk).

Sample collecting

Well-established classic methods of sample collecting were used to collect spider specimens. The spiders were caught by beating the foliage with a stick while placing a white tray under the foliage. They were also collected using both aerial and ground hand collecting methods. For hand collecting, tools like brush, forceps etc. were used. Aerial hand collecting was done by checking all the foliage and tree trunks above the knee level of the collector and ground hand collecting of spiders from the substrates was below the knee level.

Preservation and identification of spiders

For preservation, the collected spiders were directly transferred to vials containing 70% ethyl alcohol. The specimens were identified with the help of standard manuals and published literature like Tikader & Malhotra (1980), Tikader (1982), Barrion & Litsinger (1995), Jocqué & Dippenaar-Schoeman (2006), Murphy (2007), Sebastian & Peter (2009), Mondal *et al.* (2020), and World Spider Catalog (2023).

Data analysis

The data collected was used to analyse the dominance structure of spiders in Purna Wildlife Sanctuary. Dominance of each spider species (D_i) was calculated using the formula (Khofar *et al.*, 2019) $D_i = n_i/N*100$

Where, n_i = number of individuals of a particular species collected during sample collection, N = Total number of individuals collected.

Then the Tischler's scale (Tischler, 1949) was used to classify the species according to the level of dominance. According to Tischler (1949) there are five classes of dominance viz. Eudominants, Dominants, Subdominants, Recedents, and Subrecedents. Criteria for this classification are given in Table (1).

Table 1. Tischler's scale.

Class of Dominance	Percentage of Dominance
Eudominant (D_5)	10-100%
Dominant (D_4)	5-10%
Subdominant (D_3)	2-5%
Recedent (D_2)	1-2%
Subrecedent (D_1)	<1%

Guild structure analysis

Guild structure analysis of spiders of Purna Wildlife Sanctuary was done using ecological characteristics (circadian activity, method of foraging, phenology, size of the body etc.) of spider families mentioned by Cardoso *et al.* (2011). A pie chart showing the guild structure of spiders based on species richness was also made.

Results

A total of 31 species of spiders belonging to 10 families and 20 genera were documented from Purna wildlife Sanctuary through the present study. A previous study on spiders of Purna wildlife Sanctuary by Siliwal *et al.* (2003b) have identified 82 spiders up to species level. The updated checklist of spiders made by compiling the data recorded in both studies included 95 species belonging to 22 families and 55 genera. The updated checklist of species and respective guild category is given in Table (2).

Table 2. Updated checklist of spiders of Purna Wildlife Sanctuary.

No.	Family	Name of species	Guild
1	Araneidae	*Araneus bilunifer* Pocock, 1900	Orb web weavers
2		*Araneus pahalgaonensis* Tikader & Bal, 1981	
3		*Argiope aemula* (Walckenaer, 1841)	
4		*Argiope anasuja* Thorell, 1887	
5		*Argiope pulchella* Thorell, 1881	
6		*Cyclosa confraga* (Thorell, 1893)	

7		*Cyclosa hexatuberculata* Tikader, 1982	Orb web weavers
8		*Cyclosa mulmeinensis* (Thorell, 1887)	
9		*Cyrtophora cicatrosa* (Stoliczka, 1869)	
10		*Cyrtophora citricola* (Forskål, 1775)	
11		*Eriovixia excelsa* (Simon, 1889)	
12		*Eriovixia laglaizei* (Simon, 1877)	
13		*Gasteracantha kuhli* C.L. Koch, 1837	
14		*Gasteracantha unguifera* Simon, 1889	
15		*Guizygiella indica* (Tikader & Bal, 1980)	
16		*Guizygiella melanocrania* (Thorell, 1887)	
17		*Larinia phthisica* (L. Koch, 1871)	
18		*Macracantha hasselti* (C.L. Koch, 1837)	
19		*Neoscona bengalensis* Tikader & Bal, 1981	
20		*Neoscona molemensis* Tikader & Bal, 1981	
21		*Neoscona mukerjei* Tikader, 1980	
22		*Neoscona nautica* (L. Koch, 1875)	
23		*Neoscona punctigera* (Doleschall, 1857)	
24		*Neoscona sinhagadensis* (Tikader, 1975)	
25		*Neoscona theisi* (Walckenaer, 1841)	
26		*Parawixia dehaani* (Doleschall, 1859)	
27	Cheiracanthiidae	*Cheiracanthium furculatum* Karsch, 1879	Other hunters
28	Clubionidae	*Clubiona filicata* O. Pickard-Cambridge, 1874	Other hunters
29	Eresidae	*Stegodyphus mirandus* Pocock, 1899	Sheet web weavers
30		*Stegodyphus sarasinorum* Karsch, 1892	
31		*Stegodyphus tibialis* (O. Pickard-Cambridge, 1869)	
32	Gnaphosidae	*Gnaphosa poonaensis* Tikader, 1973	Ground hunters
33		*Gnaphosa stoliczkai* O. Pickard-Cambridge, 1885	
34	Hersiliidae	*Hersilia savignyi* Lucas, 1836	Sensing web weavers
35	Linyphiidae	*Linyphia sikkimensis* Tikader, 1970	Sheet web weavers
36	Liocranidae	*Sphingius barkudensis* Gravely, 1931	Ground hunters
37	Lycosidae	*Hippasa deserticola* Simon, 1889	Ground hunters
38		*Hippasa lycosina* Pocock, 1900	
39		*Lycosa madani* Pocock, 1901	
40		*Lycosa mahabaleshwarensis* Tikader & Malhotra, 1980	
41		*Lycosa pictula* Pocock, 1901	
42		*Lycosa poonaensis* Tikader & Malhotra, 1980	
43		*Lycosa tista* Tikader, 1970	
44		*Pardosa pusiola* (Thorell, 1891)	
45		*Pardosa sumatrana* (Thorell, 1890)	
46		*Wadicosa fidelis* (O. Pickard-Cambridge, 1872)	
47	Nephilidae	*Nephila kuhli* (Doleschall, 1859)	Orb web weavers
48		*Nephila pilipes* (Fabricius, 1793)	
49	Oecobiidae	*Oecobius putus* O. Pickard-Cambridge, 1876	Sensing web weavers
50	Oxyopidae	*Oxyopes birmanicus* Thorell, 1887	Other hunters
51		*Oxyopes chittrae* Tikader, 1965	
52		*Oxyopes hindostanicus* Pocock, 1901	
53		*Oxyopes javanus* Thorell, 1887	
54		*Oxyopes shweta* Tikader, 1970	

55		*Peucetia latikae* Tikader, 1970	
56	Philodromidae	*Philodromus bhagirathai* Tikader, 1966	Other hunters
57		*Thanatus dhakuricus* Tikader, 1960	
58		*Thanatus elongatus* (Tikader, 1960)	
59		*Tibellus pashanensis* Tikader, 1980	
60		*Tibellus pateli* Tikader, 1980	
61	Pholcidae	*Artema atlanta* Walckenaer, 1837	Space web weavers
62		*Crossopriza lyoni* (Blackwall, 1867)	
63	Pisauridae	*Dendrolycosa gitae* (Tikader, 1970)	Sheet web weavers
64	Salticidae	*Asemonea tenuipes* (O. Pickard-Cambridge, 1869)	Other hunters
65		*Epocilla aurantiaca* (Simon, 1885)	
66		*Hyllus semicupreus* (Simon, 1885)	
67		*Myrmarachne prava* (Karsch, 1880)	
68		*Phintella vittata* (C.L. Koch, 1846)	
69		*Plexippus paykulli* (Audouin, 1825)	
70		*Rhene flavigera* (C.L. Koch, 1846)	
71		*Telamonia dimidiata* (Simon, 1899)	
72		*Thyene imperialis* (Rossi, 1846)	
73	Scytodidae	*Scytodes fusca* Walckenaer, 1837	Other hunters
74		*Scytodes pallida* Doleschall, 1859	
75		*Scytodes thoracica* (Latreille, 1802)	
76	Sparassidae	*Heteropoda bhaikakai* Patel & Patel, 1973	Other hunters
77		*Olios milleti* (Pocock, 1901)	
78	Tetragnathidae	*Leucauge decorata* (Blackwall, 1864)	Orb web weavers
79		*Leucauge tessellata* (Thorell, 1887)	
80		*Tetragnatha extensa* (Linnaeus, 1758)	
81	Theridiidae	*Argyrodes ambalikae* Tikader, 1970	Space web weavers
82		*Argyrodes gazingensis* Tikader, 1970	
83		*Faiditus xiphias* (Thorell, 1887)	
84	Thomisidae	*Camaricus khandalaensis* Tikader, 1980	Ambush hunters
85		*Indoxysticus minutus* (Tikader, 1960)	
86		*Monaeses parvati* Tikader, 1963	
87		*Oxytate elongata* (Tikader, 1980)	
88		*Runcinia ghorpadei* Tikader, 1980	
89		*Runcinia insecta* (L. Koch, 1875)	
90		*Thomisus andamanensis* Tikader, 1980	
91		*Thomisus elongatus* Stoliczka, 1869	
92		*Thomisus pugilis* Stoliczka, 1869	
93		*Thomisus shivajiensis* Tikader, 1965	
94	Uloboridae	*Uloborus danolius* Tikader, 1969 *	Orb web weavers
95		*Uloborus khasiensis* Tikader, 1969	

* Editorial: *Uloborus danolius* Tikader, 1969 is a junior synonym of *Zosis geniculata* (Olivier, 1789), *Serket* 19(4) in press.

The guild structure of Purna Wildlife Sanctuary consist of seven functional groups. These are: Orb web weavers, Other hunters, Ground hunters, Space web weavers, Sheet web weavers, Sensing web weavers, and Ambush hunters (Fig. 2). Dominant guild was orb web weavers constituting of 34.74% of total species. After orb web weavers,

other hunters were the dominant guild (28.42%). Ground hunters constituted 15.79% of total species. They were followed by ambush hunters (10.53%), space web weavers (5.26%), sheet web weavers (4.21%), and sensing web weavers (1.05%).

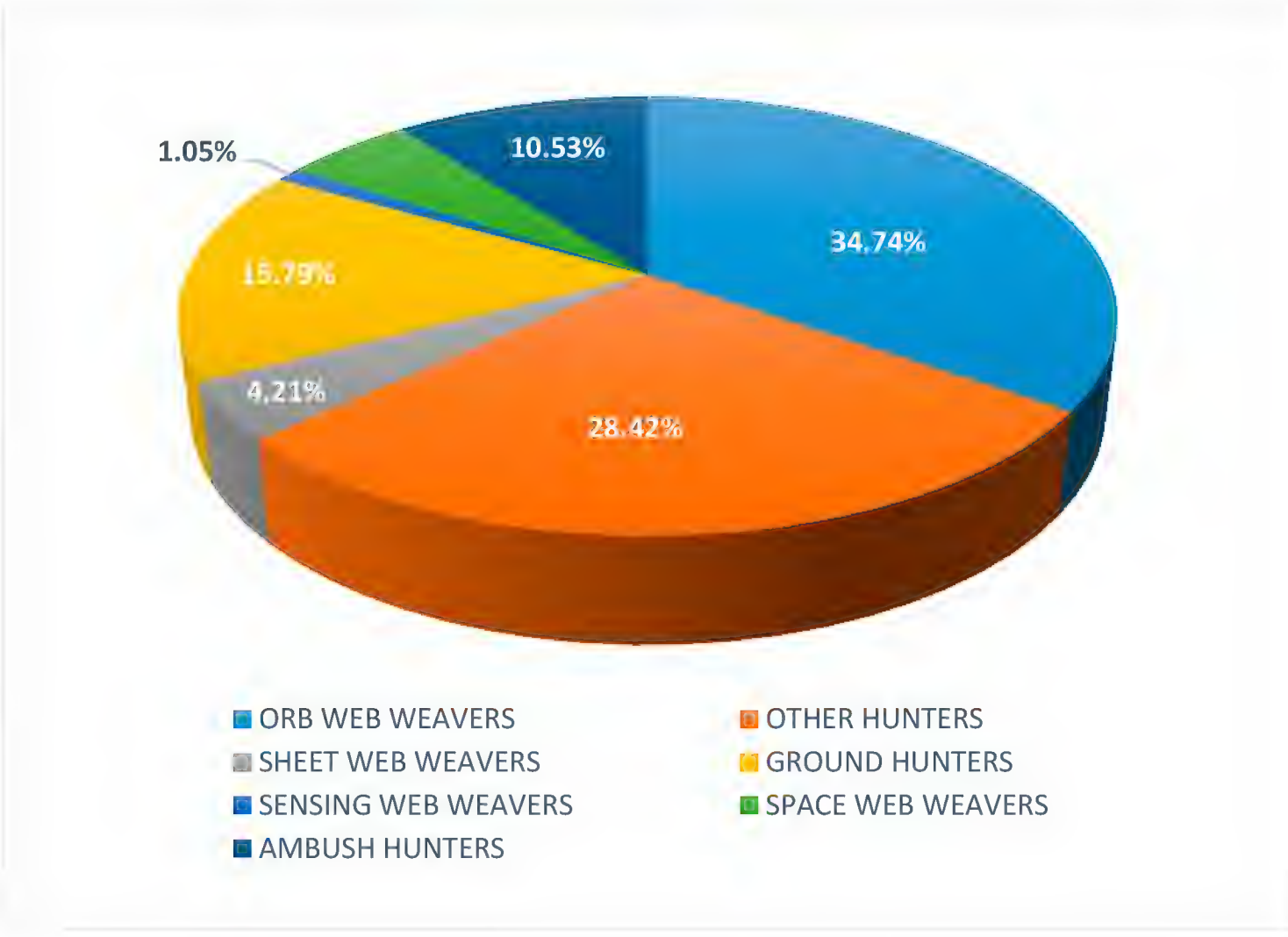

Fig. 2. Guild composition of spiders of Purna Wildlife Sanctuary.

From the analysis of data it is evident that *Argiope pulchella* is the only eudominant species (D_5) in the Purna Wildlife Sanctuary at the time of this study. Four species, viz. *Argiope aemula*, *Neoscona nautica*, *Nephila pilipes*, and *Hyllus semicupreus* belong to dominant category (D_4). *Cheiracanthium furculatum*, *Oxyopes javanus*, *Oxyopes shweta*, *Leucauge decorata*, and *Tetragnatha extensa* are subdominants (D_3). Remaining 21 species are recedents (D_2), viz. *Argiope anasuja*, *Cyclosa hexatuberculata*, *Eriovixia excelsa*, *Neoscona bengalensis*, *Neoscona mukerjei*, *Neoscona punctigera*, *Neoscona theisi*, *Pardosa sumatrana*, *Oxyopes birmanicus*, *Oxyopes hindostanicus*, *Peucetia latikae*, *Thanatus elongatus*, *Epocilla aurantiaca*, *Telamonia dimidiata*, *Thyene imperialis*, *Scytodes pallida*, *Heteropoda bhaikakai*, *Olios milleti*, *Leucauge tessellata*, *Thomisus andamanensis*, and *Thomisus shivajiensis*, and there is no subrecedent species (D_1).

Discussion

Almost all eudominant and dominant species in Purna Wildlife Sanctuary belonged to the family Araneidae. This family includes most of the orb web weavers. Guild structure analysis also showed that orb web weavers are the most dominant guild. Web building spiders consider high humidity conditions convenient for sustaining the stickiness of web which helps in efficient prey capture (Baba *et al.*, 2014). Miyashita *et al.* (2017) have produced experimental evidence for initiation of web building by spiders under high humidity conditions. According to Boutry & Blackledge (2013) prey capture performance of *Argiope* spider increased remarkably in high humidity environment. In Purna Wildlife Sanctuary high humidity condition in moist deciduous forest might be the reason for presence of more web weavers.

Extensive conversion of forestland to plantations is the impelling cause of biodiversity loss in Purna Wildlife Sanctuary. Natural forest habitats of this protected area are being converted to agriculture fields, teak, bamboo and catechu plantations for commercial benefits. Monocrop plantations have always been shown to be the crucial driver of deterioration of native fauna and flora (Panklang *et al.*, 2022). Other pitfalls of monocrop plantations include habitat degradation, soil erosion, emergence of new pests and diseases etc. (Loh *et al.*, 2022). Therefore forest encroachment in Purna Wildlife Sanctuary is a big matter of concern and have to be managed meticulously.

Conclusion

Dominance structure and guild composition of spiders in Purna Wildlife Sanctuary were analysed through this study. *Argiope pulchella*, an orb web weaver was found to be the only eudominant species in this protected area. Analysis revealed presence of seven guilds viz. Orb web weavers, Other hunters, Ground hunters, Space web weavers, Sheet web weavers, Sensing web weavers, and Ambush hunters in Purna Wildlife Sanctuary. Orb web weavers constituted the dominant guild. Updated checklist documented 95 species of spiders belonging to 22 families and 55 genera. Presence of higher number of orb web weavers may be due to the high humidity conditions prevailing in this sanctuary. Conversion of forest land to plantations in this protected area is a cause for great concern.

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First record of male spider *Coscinida tibialis* Simon, 1895 (Araneae: Theridiidae) from Solapur, Maharashtra, India

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Abstract

The first record of the male of *Coscinida tibialis* is reported from India, based on male specimens collected from pomegranate orchard in Aran village, Solapur, Maharashtra State. The validation of species is based on illustrations of both male and female genitalia.

Keywords: *Coscinida tibialis*, Range extension, Pomegranate orchard, India.

Introduction

The genus *Coscinida* is represented by seventeen species in the world (World Spider Catalog, 2023) and is widely distributed in pantropical region (Knoflach *et al.*, 2005). *Coscinida* are tiny spiders (less than 2 mm total length) belonging to family Theridiidae. Eyes are reasonably large and closely grouped, with median eyes closer to laterals than to each other. Colulus is absent. Upper-mesal margin of cymbium is drawn into an external pointed hook (Levy, 1998).

The present study deals with the first record of the male *Coscinida tibialis* Simon, 1895 from India, so as to extend the known range of *Coscinida tibialis* in India. Previous description of this species from India was based on a single female specimen collected from Melghat region, Amravati district, Maharashtra, a part of Satpuda Landscapes in Central India (Rajoria, 2015; World Spider Catalog, 2023).

Fig. 1. *Coscinida tibialis* Simon, 1895 Habitus. A-B. Female. C-D. Male. A, C. dorsal view. B. ventral view. D. lateral view.

Material and Methods

The species identity is based on observations on two males and two females that were collected using an active search in pomegranate orchard in Aran village located in Madha Tehsil, Solapur district, Maharashtra. The specimens were preserved in 70% ethanol solution. The male pedipalp and female genitalia were carefully removed using fine surgical scalpel. The epigyne was then treated with 10% aqueous solution of potassium hydroxide (KOH) to enhance visibility. The identification of the specimen was performed using a Carl-Zeiss Stemi 305 Stereo-Zoom microscope equipped with a Tucsen GT5.0 Colour Microscope Camera. All measurements recorded in this study are expressed in millimetres.

Abbreviations used: C = conductor, CD = copulatory duct, CO = copulatory opening, Cy = cymbium, E = embolus, FD = fertilization duct, MA = median apophysis, S = subtegulum, T = tegulum.

Results

Taxonomy

Coscinida tibialis Simon, 1895 (Figs. 1-4)

Coscinida tibialis Simon, 1894: 529
Coscinida tibialis Simon, 1895: 137

Material examined: 2♂♂ and 2♀♀ specimens were collected on 19th December, 2021 from Aran village, Madha, Solapur, Maharashtra (17°55'47.31"N, 75°21'50.01"E) collected by Shripad Manthen.

Diagnosis
Habitus: Female (Fig. 1A-B), Male (Fig. 1C-D).
Description: For detailed description of the species refer to Levy (1998) and Knoflach *et al*. (2005).
Female Epigynum: The diagnostic characters of female vulva discussed here follow the description by Knoflach *et al*. (2005): Weakly sclerotized epigynum is divided sagittally by two sclerotized, sinuous ridges with indistinct atrium; copulatory ducts with narrow lumen, closely associated with rececptacula (Fig. 2).

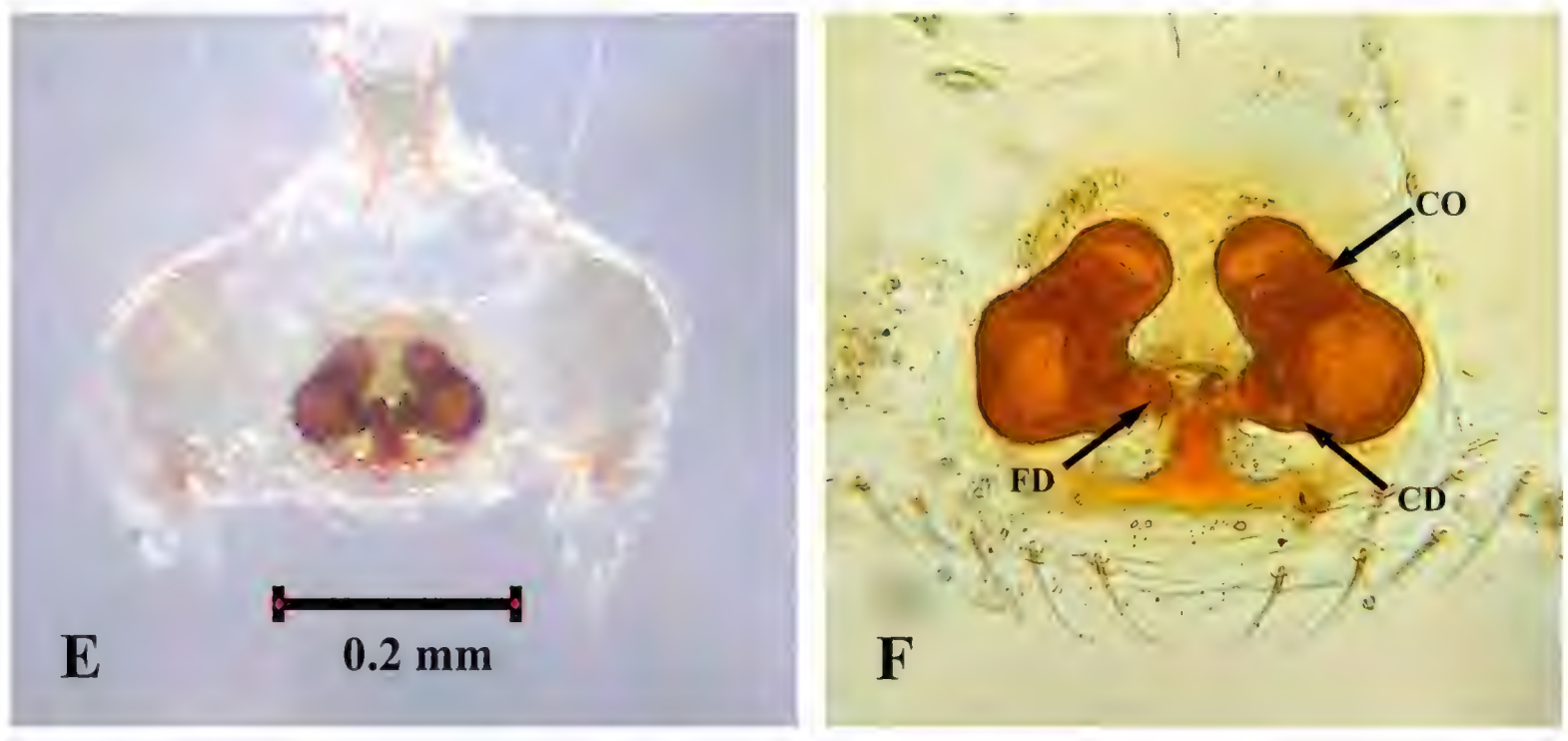

Fig. 2. *Coscinida tibialis* Simon, 1895 ♀. E. Epigynum, ventral view. F. Vulvae, dorsal view. (Cleared).

Male palp: The diagnostic characters of male palp follows the description by Levy (1998): The Mesal margin of cymbium (Cy) close to distal tip of bulb armed with a black, sclerotized, pointed hook; median apophysis (Ma) consists of a broad, fleshy basal portion and a slender protuberance rising from inside and extending to tip of bulb; embolus (E) rises on retrolateral side of bulb and extends into a central deep groove formed by folds of the conductor; walls of conductor (C) groove attenuate distally forming two black, pointed processes (Fig. 3).
Distribution: Africa, southern Europe, Turkey, Israel, Yemen. Introduced to Thailand (World Spider Catalog, 2023); and India (Rajoria, 2015 and current record).
Natural History: Specimens were collected on 19th Dec. 2021 in organic mulches made using natural straws, leaf litter and compost prepared as a bed along the rows of pomegranate plants (Fig. 4). Previous studies have also documented this *Coscinida tibialis* as ground dwelling species found in litter and under stones in semisynanthropic habitats such as gardens and cultivated areas (Knoflach *et al*., 2005).

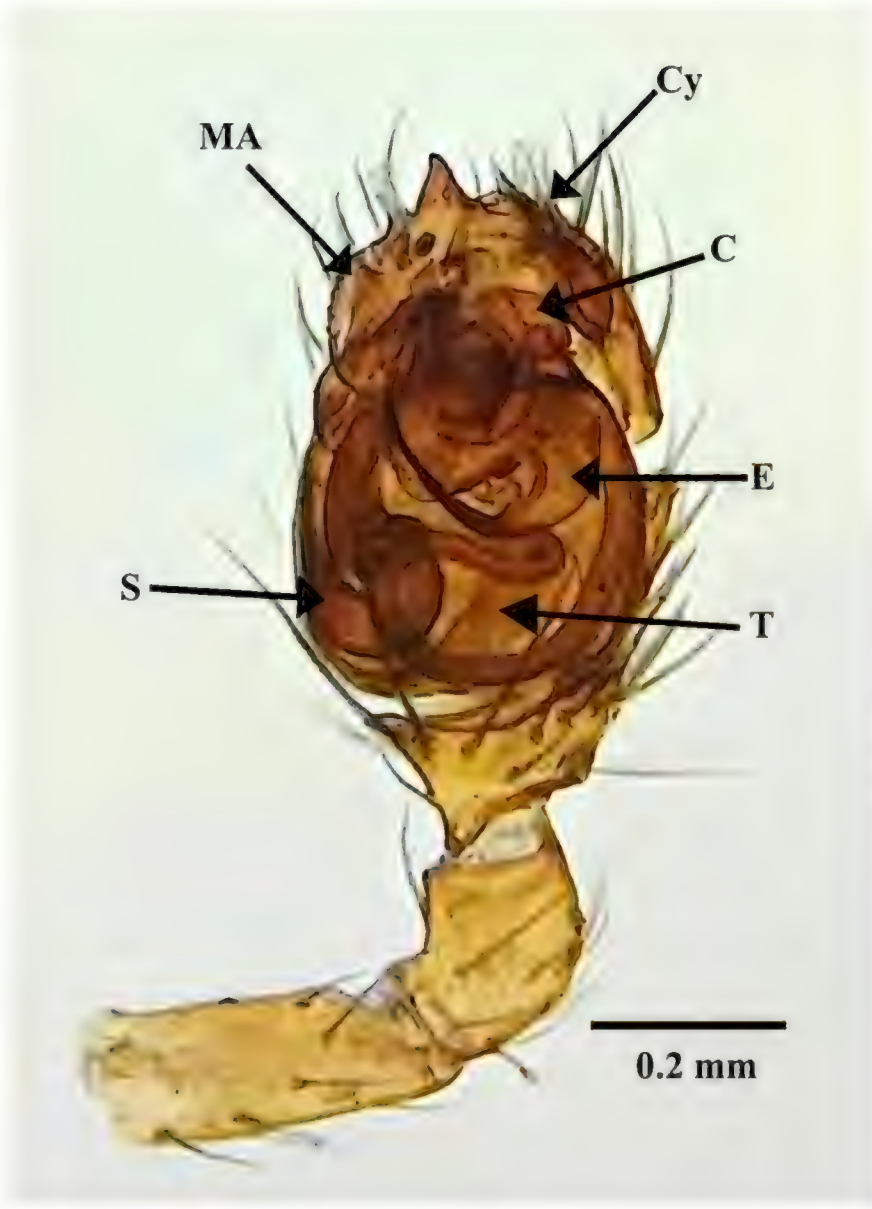

Fig. 3. *Coscinida tibialis* Simon, 1895 ♂ Palp, ventral view.

Fig. 4. Habitat of *Coscinida tibialis* Simon, 1895 in pomegranate orchard, Aran village, Madha, Solapur, Maharashtra, India.

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Serket (2023) vol. 19(4): 378-381.

First record of *Amaurobius strandi* (Araneae: Amaurobiidae) from Türkiye

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Abstract

The amaurobiid spider species *Amaurobius strandi* Charitonov, 1937 is recorded for the first time from Türkiye. Its characteristic features and photographs are presented. This new record increases the total number of species of family Amaurobiidae in Türkiye to six species.

Keywords: Spider, Amaurobiidae, *Amaurobius strandi*, Türkiye.

Introduction

In family Amaurobiidae Thorell, 1869, 288 species of 50 genera have been identified in the World (World Spider Catalog, 2023). There are 5 species in 2 genera from this family are known in Türkiye (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2023). *Amaurobius* C.L. Koch, 1837 is the largest genus of Amourobidae with 67 species distributed in the World (World Spider Catalog, 2023).

This paper deals with the characteristic features and distribution of *A. strandi* Charitonov, 1937 adding it as a new Amaurobiid species to the araneo-fauna of Türkiye.

Amaurobius strandi is recorded from Greece, Bulgaria, Ukraine, and Southern Russia until now (Blagoev *et al.*, 2018; Helsdingen *et al.*, 2018; Kovblyuk *et al.*, 2016; Otto, 2022; World Spider Catalog, 2023).

Material and Methods

Four samples of *Amaurobius strandi* were found among fallen leaves and collected with hand aspirator from Kastamonu province in Türkiye. They were preserved

in 70% ethanol. In the identification of this species, publications of Charitonov (1937) and Kovblyuk (2002) were consulted. The identification was made by means of SZX7 Olympus stereomicroscope. The examined samples are preserved in Niğde Ömer Halisdemir University Arachnology Museum (NÖHUAM).

Results

Family **Amourobiidae** Thorell, 1869
Genus ***Amourobius*** C.L. Koch, 1837
Amaurobius strandi Charitonov, 1937

Material examined: Türkiye, Kastamonu province, Taşköprü district, Hasanlı village, 41°23'27.41"N, 34°31'22.58"E, 983 m, 2♀♀ 2♂♂, 20.10.2007, Leg. T. Türkeş (Fig. 1).

Fig. 1. Locality of *Amaurobius strandi* Charitonov, 1937 in Türkiye.

Description: Female body length: 6-6.5 mm (Fig. 2a). Male body length: 5-5.5 mm (Fig. 3a). Prosoma yellow-brown, dark brown cephlic region, legs yellow-brown, chelicerae brown, sternum yellow-brown, opisthosoma yellow-grey with dark grey pattern (Figs. 2a, 3a). Epigyne as in Fig. (2b) and vulvae as in Fig. (2c). Male palp as in Figs. (3b, 3c, 3d) and palpal tibia as in Fig. (3e).

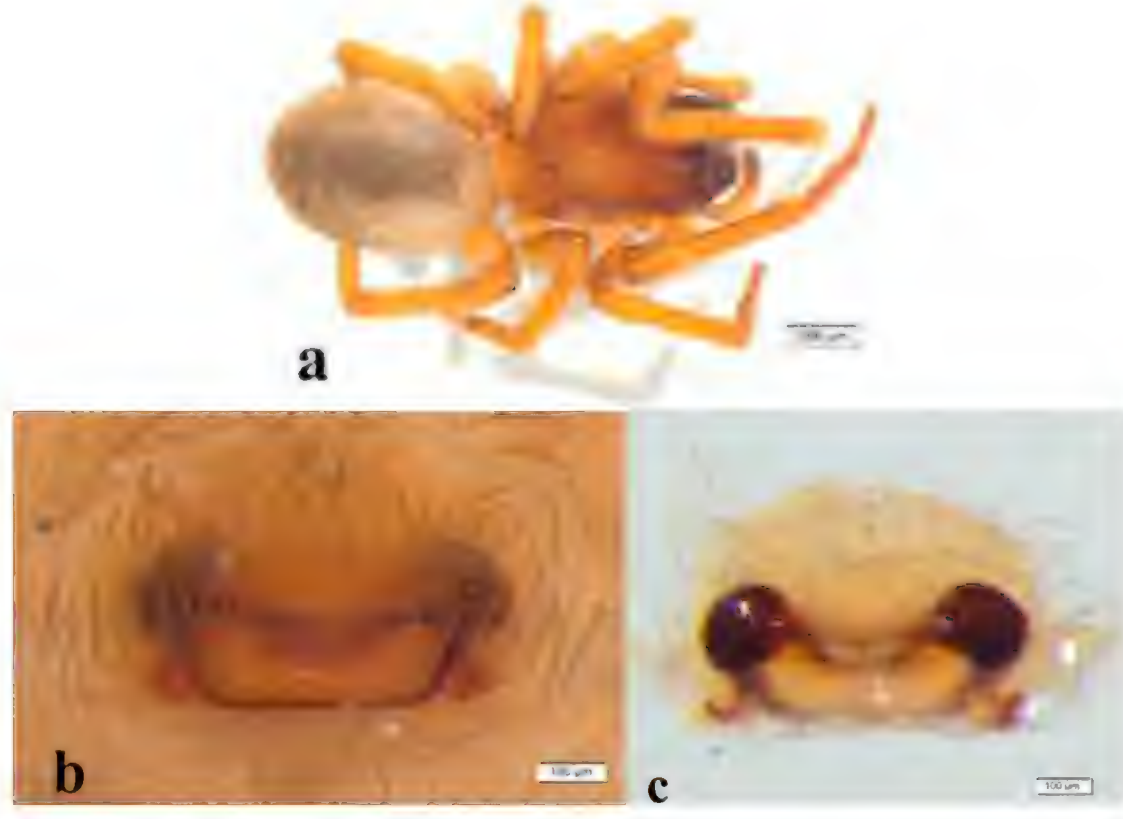

Fig. 2. *Amaurobius strandi* Charitonov, 1937 ♀. a. habitus, dorsal view. b. epigyne, ventral view. c. vulvae, dorsal view.

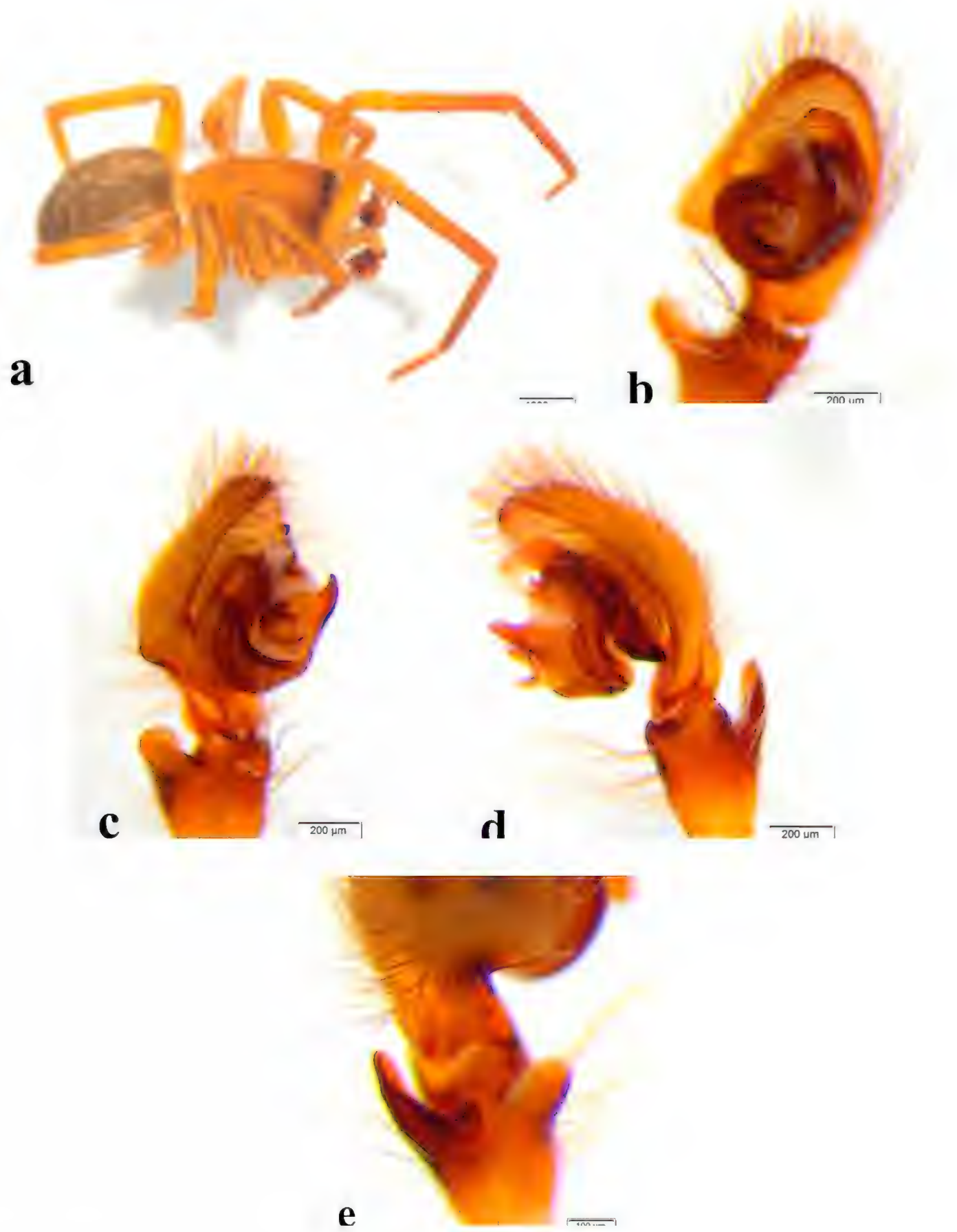

Fig. 3. *Amaurobius strandi* Charitonov, 1937 ♂. a. habitus, dorsal view. b-e. pedipalp. b. ventral view. c. prolateral view. d. retrolateral view. e. palpal tibia, dorsal view.

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New locality record of *Clubiona frutetorum* L. Koch, 1867 (Araneae: Clubionidae) in Türkiye

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Abstract

Clubiona frutetorum L. Koch, 1867 is known from only one locality in Türkiye. In this study, we could find this species from a new locality to add it to its distribution in Anatolia. Its general habitus and female genitalia are illustrated.

Keywords: Spiders, *Clubiona frutetorum*, new locality, Ihlara Valley, Türkiye.

Introduction

Clubionidae Wagner, 1887 is a small family in Order Araneae and is currently represented by 666 species belonging to 18 genera worldwide (World Spider Catalog, 2023). There are 14 species of clubionids reported from Anatolia (Topçu *et al.*, 2005; Demir &Seyyar, 2017; Danışman *et al.*, 2023; Türkeş *et al.*, 2023).

Thirteen species of genus *Clubiona* Latreille, 1804 are known from Türkiye. Among them, the species *C. frutetorum* L. Koch, 1867 is only known from one locality, Kırıkkale province in Türkiye. We could find two female specimens of this species from Ihlara Valley, special habitat in Central Anatolia Region. The aim of this paper is to present a new locality record of the clubionid spider *C. frutetorum* in Türkiye. The new finding of this species widens its distribution in Türkiye (Fig. 1).

Material and Methods

In this study, two female specimens were collected from Ihlara Valley in Central Anatolia. Examined specimens were preserved in 70% ethanol and deposited in the Niğde

Ömer Halisdemir University Arachnological Museum (NÖHUAM). For identification, Heimer & Nentwig (1991) and Danışman *et al.* (2018) were consulted. The identification was made by means of a SZX61 Olympus stereomicroscope.

Fig 1. Map of Türkiye showing localities of *Clubiona frutetorum* L. Koch, 1867 in Türkiye: 1. black circle, old record. 2. triangle, new locality (Ihlara Valley).

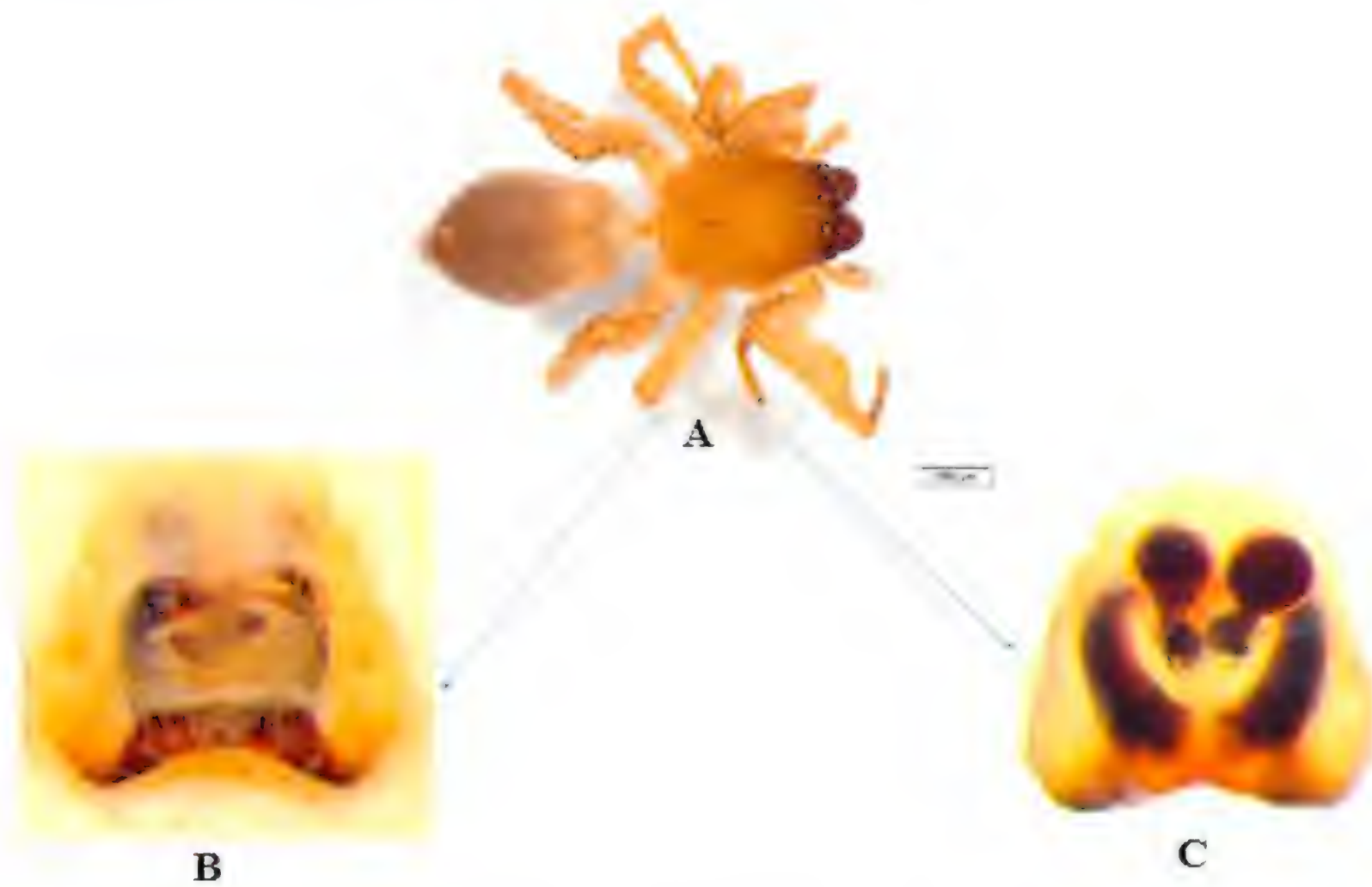

Fig. 2. *Clubiona frutetorum* L. Koch, 1867) ♀. A. habitus, dorsal view. B. epigyne, ventral view. C. vulvae, dorsal view.

Results

Clubiona frutetorum L. Koch, 1867 (Fig. 2)

Clubiona incompta Ohlert, 1867
Clubiona (Heteroclubiona) frutetorum Lohmander, 1944

Clubiona frutetorum Sterghiu, 1985
Clubiona frutetorum Danışman, Coşar & Özgen, 2018

For complete taxonomic references, see World Spider Catalog (2023).

Collected specimens: 2♀♀, Central Anatolia Region: Aksaray Province, Ihlara Valley (38°15'48"N, 34°17'27"E), 1195 m, 27.VIII.2022, Leg. Osman Seyyar & Tuncay Türkeş.

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Leviellus kochi (Thorell, 1870) (Araneae: Phonognathidae) is a new record in Türkiye

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Abstract

The phonognathid spider species *Leviellus kochi* (Thorell, 1870) is reported for the first time from Türkiye. Its general habitus and genitalia are illustrated. Brief description and collecting data of this species are also given.

Keywords: Spider, Phonognathidae, *Leviellus*, Türkiye.

Introduction

In family Phonognathidae Simon, 1894, twenty eight species of five genera have been identified in the world (World Spider Catalog, 2023). There are four species of two genera from this family recorded in Türkiye, i.e. *Leviellus stroemi* (Thorell, 1870), *Zygiella keyserlingi* (Ausserer, 1871), *Zygiella montana* (C.L. Koch, 1834), and *Zygiella x-notata* (Clerck, 1757) (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2023). The new record of *Leviellus kochi* (Thorell, 1870) in this study constitutes the second one of *Leviellus* species known from Türkiye. *L. kochi* is known from Southern Europe, North Africa, and Central Asia (World Spider Catalog, 2023).

Material and Methods

In Ihlara Valley, a special habitat in the Central Anatolia Region, a single female specimen of *Leviellus kochi* was found under tree bark, collected, photographed, and preserved in 70% ethanol. Species identification was made using a SZX7 Olympus stereomicroscope. In the identification of this species, the publications of Levi (1974),

and Wiehle (1931) were consulted. The studied specimen was sent to the Niğde Ömer Halisdemir University Arachnological Museum (NÖHUAM). The aim of this article is to present the new record of the phonognathid spider *L. kochi* in Türkiye. The new finding of this species in Türkiye expands its distribution eastwards (Fig. 1).

Fig 1. Locality of *Leviellus kochi* (Thorell, 1870) in Türkiye.

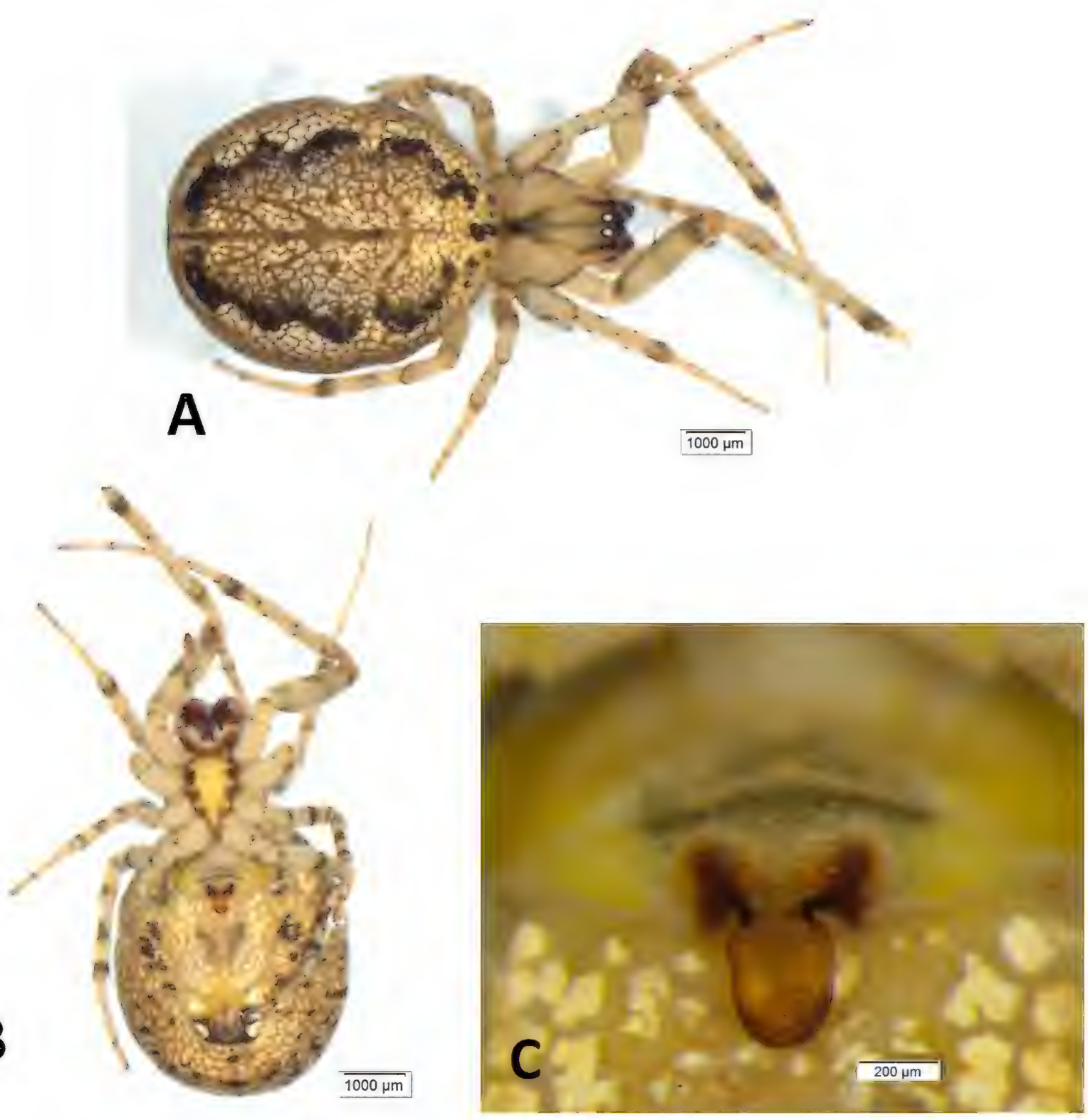

Fig. 2. *Leviellus kochi* (Thorell, 1870) ♀. A-B. Habitus. A. dorsal view. B. ventral view. **C**. epigyne, ventral view.

Results

Family **Phonognathidae** Simon, 1894
Genus ***Leviellus*** Wunderlich, 2004
Leviellus kochi (Thorell, 1870)

Synonyms
Zilla kochii Thorell, 1870
Zilla kochi Bösenberg, 1901; Wiehle, 1931
Zygiella kochi Simon, 1929; Levi, 1974
Leviellus kochi Wunderlich, 2004; Dentici, 2019; Morano, 2023

For taxonomic references, see World Spider Catalog (2023).

Collected specimen: 1♀, Central Anatolia Region: Aksaray Province, Ihlara Valley (38°15'48"N, 34°17'27"E), 1195 m, 15.10.2022, Leg. Osman Seyyar & Tuncay Türkeş.

Description ♀: Body length: 8 mm (Fig. 2A). Prosoma grey-yellow, margin and eye region black darkened, legs grey-yellow, darkly annulated, chelicerae grey-yellow, sternum yellow with black darkened margin, opisthosoma grey-yellow, ventrally with dark median stripe (Fig. 2A-B). Epigyne: scape heart-shaped, longer than wide, constricted at base (Fig. 2C).

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Tegenaria pseudolyncea (Guseinov, Marusik & Koponen, 2005) (Araneae: Agelenidae) is a new record for Turkish spider fauna

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Abstract

The agelenid spider species *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) is reported for the first time from Türkiye. The morphological characters and palpal organ of this species were photographed. The locality record where the species was collected is indicated on a map.

Keywords: Spider, Agelenidae, *Tegenaria pseudolyncea*, Türkiye.

Introduction

In the Agelenidae, 1387 species in 96 genera have been identified in the world (World Spider Catalog, 2023). There are 73 species in 16 genera from this family recorded in Türkiye (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2023). So far in Türkiye thirty six species were known to exist. *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) is added in this article to raise the number of agelenid species known from Türkiye to seventy-four.

Material and Methods

A male sample of *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) was collected from Tokat province, Niksar district, Özdemir village and preserved in 70% ethanol. The work of Guseinov *et al.* (2005) was consulted for the identification of this species. SZX7 Olympus stereomicroscope was used to know the identification.

The examined sample was donated to the Niğde Ömer Halisdemir University Arachnology Museum (NÖHUAM).

Results

Family **Agelenidae** C.L. Koch, 1837
Genus ***Tegenaria*** Latreille, 1804
Tegenaria pseudolyncea (Guseinov, Marusik & Koponen, 2005)

Material examined: Türkiye, Tokat province, Niksar district, Özdemir village, 40º40'57"N, 36º59'38"E, 1200 m, 1♂, 13.06.2008, Leg. T. Türkeş (Fig. 1).

Fig 1. Locality of *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) in Türkiye.

Distribution: *Tegenaria pseudolyncea* has been known from Azerbaijan (Guseinov *et al.*, 2005; Otto, 2022) and Georgia (Ponomarev & Komarov, 2015) (World Spider Catalog, 2023).

Description: Male body length: 6.15mm (Fig. 2a-b). Prosoma brown with dark grey radial stripes and dark brown median stripe in cephalic region, chelicerae dark brown, legs dark grey, opisthosoma with pattern of grey degrees (Fig. 2a-b). Pedipalp as in Fig. (3).

Fig. 2. *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) ♂. a-b. habitus. a. dorsal view. b. ventral view.

Fig. 3. *Tegenaria pseudolyncea* (Guseinov, Marusik & Koponen, 2005) ♂. a-b. Pedipalp. a. retrolateral view. b. ventral view. c-d. palpal tibia. c. retrolateral view. d. dorsal view.

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First record of *Hersilia caudata* Savigny, 1825, *Tama edwardsi* (Lucas, 1846) (Hersiliidae) and *Mimetus laevigatus* (Keyserling, 1863) (Mimetidae) from Morocco

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Abstract

This is the first record of three species of spiders: *Hersilia caudata* Savigny, 1825, *Tama edwardsi* (Lucas, 1846) (Hersiliidae Thorell, 1869) and *Mimetus laevigatus* (Keyserling, 1863) (Mimetidae Simon, 1881) from Beni Mellal, Morocco, based on 7 female specimens: 2♀♀ of *H. caudata* and 2♀♀ of *M. laevigatus* collected from 2 olive groves, and 3♀♀ of *T. edwardsi* collected on calcareous rock formations in the Beni Mellal mountains.

Keywords: *Hersilia caudata*, *Tama edwardsi*, Hersiliidae, *Mimetus laevigatus*, Mimetidae, Beni Mellal, Morocco.

Introduction

What we know about Moroccan spiders is insufficient and needs very extensive studies. This is for a more accurate knowledge of Moroccan and even North African spiders in general.

The Hersiliidae Thorell, 1869 spiders of the genus *Hersilia* Savigny, 1825 and Tama Simon, 1882 are so good at camouflaging on logs and rocks, and this protects them from potential predators such as birds. But they are easy to spot at night with a flashlight.

Hersilia caudata Savigny, 1825 (the only known species of genus *Hersilia* in North Africa) is widespread in Egypt, where the species was described for the first time by Savigny (In Audouin, 1825; Sallam, 2012; El-Hennawy, 2017), in Sudan (Benoit, 1967; El-Hennawy; 2010), in Palestine/Israel (Levy, 2003), in Yemen (Rheims *et al.*,

2004), in Burkina Faso, Cape Verde Islands, Chad, Nigeria, Cameroon, Guinea, Ivory Coast, Mali, Senegal, Somalia, and Togo (Foord & Dippenaar-Schoeman, 2006). With one enigmatic specimen recorded by Baehr & Baehr (1993) from the Oriental Region from Turkestan (Singkiang) in western China.

Tama edwardsi (Lucas, 1846) is a smaller species than *Hersilia* species. The distribution of this species includes Spain, Portugal (Le Peru, 2011; Branco *et al.*, 2019), and Algeria (Le Peru, 2011).

Mimetus laevigatus (Keyserling, 1863) is the only known species of the genus *Mimetus* Hentz, 1832 in Europe and North Africa. Spiders of this species are very small and camouflage well in the branches and trunks of trees. This species is spread in Mediterranean to Central Asia. Among the Mediterranean and Eastern European countries where species is common: Portugal and Spain (Branco *et al.*, 2019), Tunisia (Bosmans, 2003), Hungary (Samu & Szinetár, 1999), Albania (Kůrka *et al.*, 2020), Turkey (Topçu *et al.*, 2005; Tutar & Yağmur, 2023), Egypt (El-Hennawy, 2017), Armenia (Zarikian *et al.*, 2022), Cyprus (Bosmans *et al.*, 2019) Southern Russia (Ponomarev, 2008).

Although some of these species are widespread throughout the Mediterranean or North Africa. However, to this day, there is no data mentioned about the presence of these three species in Morocco.

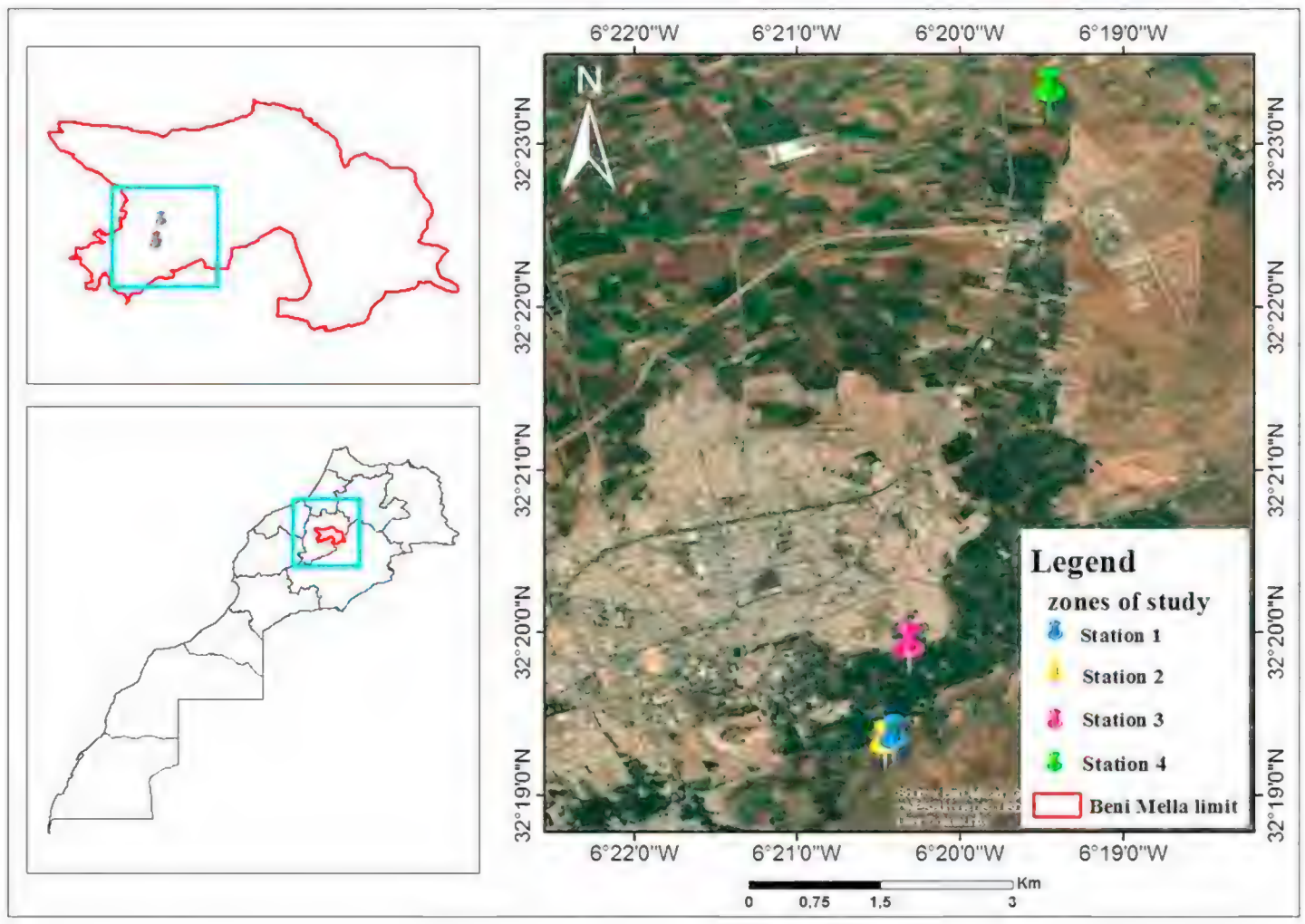

Fig. 1. Location of four collecting stations in Beni Mellal, Morocco.

Material and Methods

Four stations were selected in the study area in Beni Mellal (Fig. 1): Station 1 (32°19'10.2"N, 6°20'24.9"W) and station 2 (32°19'08.2"N, 6°20'28"W) located near Ain Asserdoune, Beni Mellal, mountainous habitats characterized by calcareous rock formations (In these two stations, we collected three female specimens of *Tama edwardsi* on 14 May 2023). Station 3 (32°19'43.5"N, 6°20'19.2"W) is an olive grove also located near Ain Asserdoune in the north (In this station we collected one female specimen of *Hersilia caudata* and one female specimen of *Mimetus laevigatus*), station 4

(32°23'08.2"N, 6°19'27"W) is an olive grove in Mghila (We collected one female specimen of *Mimetus laevigatus* and one female specimen of *H. caudata* from this station). The specimens were deposited in the laboratory of Faculty of Sciences and Techniques Beni Mellal.

Results and Discussion

Family **Hersiliidae** Thorell, 1869
Genus **Hersilia** Savigny, 1825
Hersilia caudata Savigny, 1825

Fig. 2. *Hersilia caudata* Savigny, 1825 ♀ from Beni Mellal, Morocco.

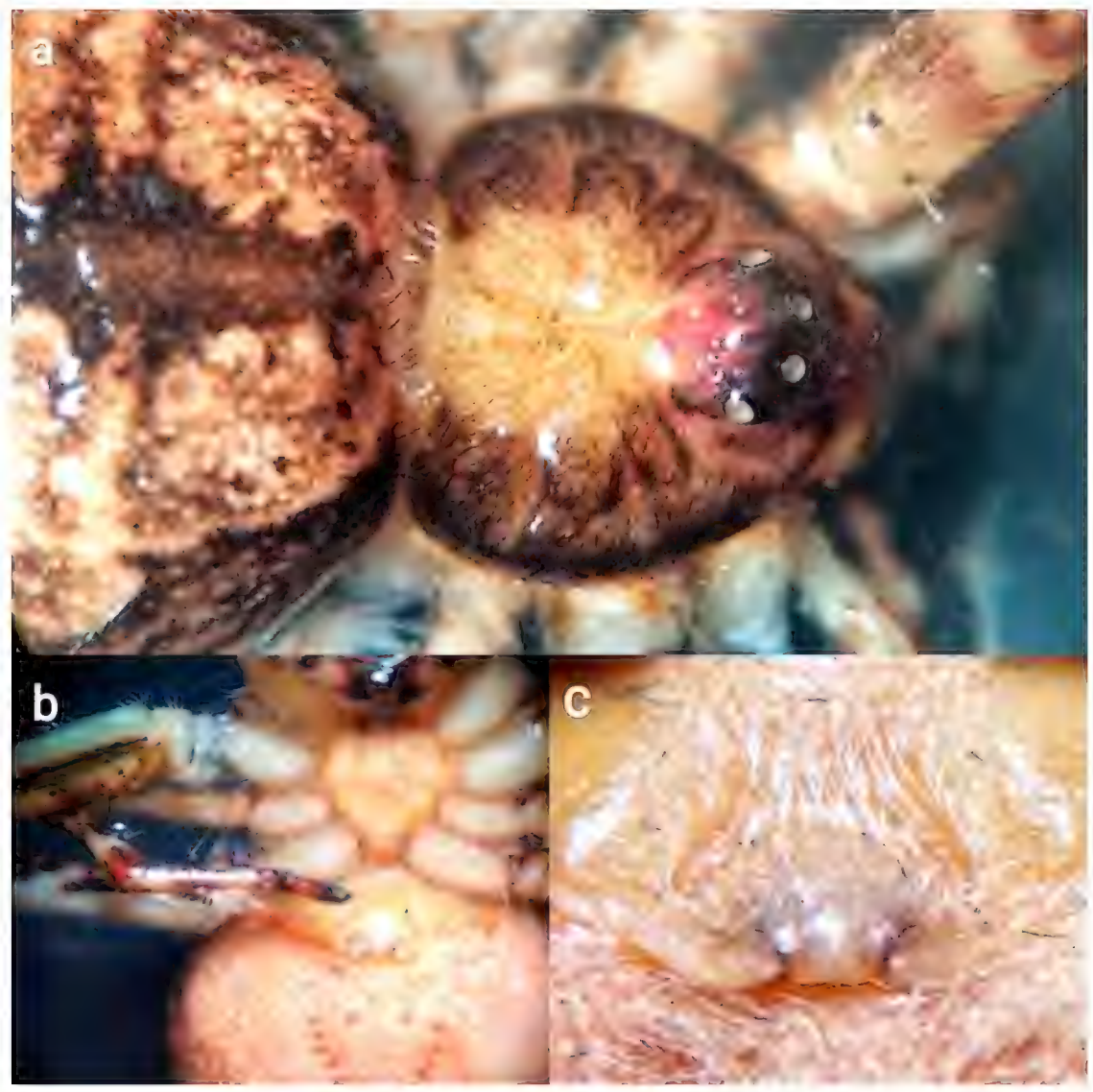

Fig. 3. *Hersilia caudata* Savigny, 1825 ♀. a. prosoma, dorsal view. b. sternum and opisthosoma, ventral view. c. epyginum.

Material examined: 1♀, Near Ain Asserdoune, 23/05/2023, 32°19'43.5"N, 6°20'19.2"W (Station 3). 1♀, Mghila, 05/06/2023, 32°23'08.2"N, 6°19'27"W (Station 4). Both specimens were collected on olive trees (*Olea europaea* L.).
Description: The colouration of the body is very distinctive, which makes the species well camouflaged on the trunks of trees, especially olive trees in the area. Body colour is golden brown, with dark bands in legs (Fig. 2), total body length 9.5 mm, prosoma length 3.5 mm and it is wider posteriorly and narrowing anteriorly with dark sides (Fig. 3a), opisthosoma length 6 mm and it is covered with plumose setae with four pairs of round dorsal sigilla, legs are banded and very long except legs III.
Epigynum light-coloured bordered on sides by dark, arched margins (Fig. 3c).

Family **Hersiliidae** Thorell, 1869
Genus **Tama** Simon, 1882
Tama edwardsi (Lucas, 1846)

Material examined: 2♀, Near Ain Asserdoune, 14/05/2023, 32°19'10.2"N, 6°20'24.9"W (Station 1). 1♀, Near Ain Asserdoune, 14/05/2023, 32°19'08.2"N, 6°20'28"W (Station 2). The three specimens were collected from the calcareous rocks characteristic of the Beni Mellal Mountains.
Description: *Tama edwardsi* is a ground-dwelling spider and presents elongated spinnerets and modified metatarsi (Rheims & Brescovit, 2004). They are small spiders compared to *Hersilia* species such as *H. caudata*. The colour of the body is grey close to yellow, which is very distinctive and ensures that the species is mixed with rocks (Fig. 4a). The body length varies between 5.5 mm and 6 mm. Prosoma is 2 mm long with the position of the eyes clearly elevated. Opisthosoma length 3.5 mm. The legs are forked with bristles and are very long, except for the legs III.
Epigynum (summarised from Ribera *et al.*, 1988) very simple, without sclerotised plate, reduced to a pair of openings on the epigastric furrow (Fig. 4b).

Fig. 4. *Tama edwardsi* (Lucas, 1846) ♀. a. spider with prey well camouflaged on rock. b. epigynum.

Family **Mimetidae** Simon, 1881
Genus **Mimetus** Hentz, 1832
Mimetus laevigatus (Keyserling, 1863)

Material examined: 2♀, same localities for *H. caudata* specimens (Stations 3 & 4).
Description (summarised from Topçu *et al.*, 2005)**:** Body length about 5.5-6 mm.. prosoma length about 3.2 mm, opisthosoma length 2.3-2.8 mm. Carapace yellowish-light brown, longer than wide, with median black stripe. Opisthosoma greyish, spherical, with yellow spots, transverse black lateral bands and long hairs (Fig. 5b). Chelicerae light brown, rather long, with some wide black spots. Legs yellowish brown, with black spots. Tibiae and metatarsi of front legs with a series of long curved spines alternating with short ones. Colulus present. Anterior spinnerets longer than posterior spinnerets.
Epigynum oval, sclerotised, greyish-brown, with circular median cavity (Fig. 5c).

Fig. 5. *Mimetus laevigatus* (Keyserling, 1863) ♀. a-b. habitus. a. dorsal view. b. ventral view. c. epigynum.

Discussion

This work may make us reconsider the distribution of these three species, as they are closely related to trees, especially *H. caudata* and *M. laevigatus*. Our sample collecting was restricted to olive trees and we did not examine other trees. But it is clear that these species are adapted to their environment and may colonize any possible environment that guarantees them good camouflage.

Acknowledgment

We present this work to our professor at the faculty of Sciences and Techniques Beni Mellal, Dr. Abdelali Boulli, whom we appreciate for his valuable advices, as well as to everyone who contributed from near and far to this research.

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A new species of *Pandinus* Thorell, 1876 from the Sahelian wooded steppes of Burkina Faso (Scorpiones: Scorpionidae)

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Abstract

A new species of the genus *Pandinus* Thorell, 1876 is described on the basis of six males and three females collected in the Sahelian wooded steppes of Burkina Faso. The new species is mainly characterized by a small size, a reduced pectinal tooth count, a length to depth ratio of fourth metasomal segment lower than 2, a number of ventral trichobothria on pedipalp patella lower than 30, tergites and internal face of pedipalp chela almost smooth and chela manus paler than body. The new taxon described here raises the number of currently recognized species for the genus *Pandinus* to five and the number of known scorpion species in Burkina Faso to eight.

Keywords: Scorpion, *Pandinus sahelicus* **sp. n.**, taxonomy, new species, description, morphology, Sahel, wooded steppes, Burkina Faso.

Introduction

The genus *Pandinus* was created in 1876 by Thorell, having as type species, by original designation, *Pandinus africanus* Thorell, 1876, later synonymized with *Pandinus imperator* (C.L. Koch, 1841) (Fet *et al*., 2000). Among the species currently composing the genus *Pandinus, P. imperator* was the first to be described, in 1841 by C.L. Koch as *Buthus imperator*, based on a dry specimen from an unknown locality. The holotype was originally deposited in the Museum of Berlin, Germany and considered as lost before being recently rediscovered in the Museum of Stuttgart, Germany (Holstein *et al*., 2017). Simon (1872) described *Heterometrus roeseli* from Guinea and Becker (1880) described

Scorpio simoni from an unknown locality but both species were synonymized with *P. imperator* in 1893 by Thorell, while the first one was revalidated in 2014 by Lourenço as *Pandinus roeseli* (Simon, 1872) but synonymized again with *P. imperator* in 2016 by Prendini. *Pandinus gambiensis* Pocock, 1899 was originally described as a subspecies of *P. imperator* then elevated to species level in 1967 by Vachon. Finally, Kovařík (2011) described *P. ugandaensis* from Uganda and Rossi (2014) described *Pandinus ulderigoi* from Central African Republic.

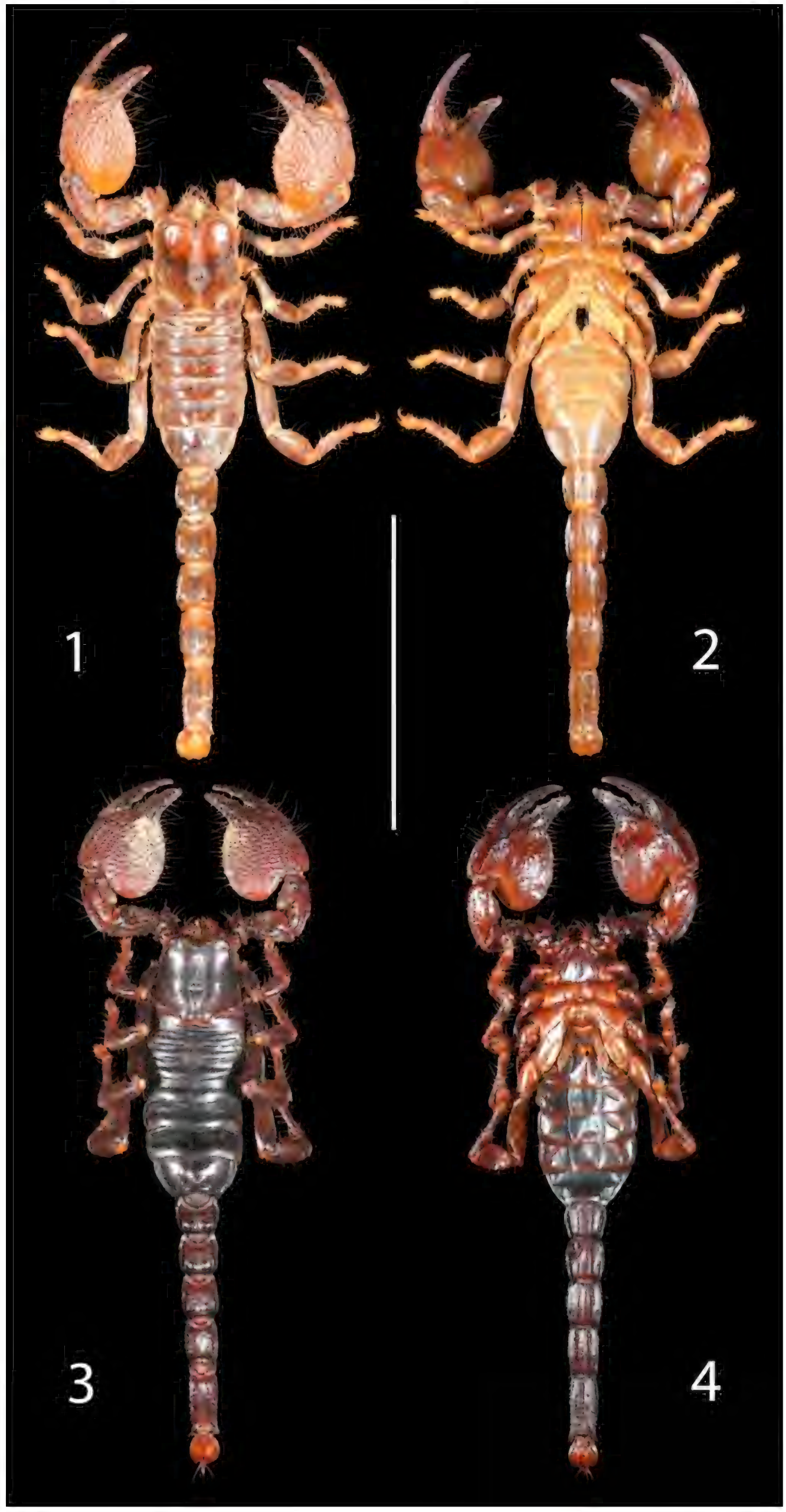
P. imperator is known to have a wide distributional range in West Africa, covering mainly tropical forests and savannahs going from Guinea to Cameroon (Figs. 17-18). This species is also known to present a significant variation in body size depending on the environment (Lourenço & Cloudsley-Thompson, 1999, Prendini, 2016). This feature, together with the broad geographic coverage of the species covering different biotopes, led to the study of populations occurring at the ends of the known distributional range, notably in the dry to semi-arid areas. Lourenço (2014) described *Pandinus camerounensis* Lourenço, 2014 from a transitional zone between the Sahel and savannah formations in northern Cameroon, mainly based on the small size of the species and the size and structure of the hemispermatophores, but this species was later synonymized with *P. imperator* (Prendini, 2016). The study of the scorpion collection from the late Dr. André Prost (1944-2023), recently bequeathed to the Museum of Lyon, France, including *Pandinus* specimens from northern Burkina Faso, led to re-open the question of the status of populations occurring in the northern arid zones, and to the description of a new species, *Pandinus sahelicus* **sp. n.**, characterized by a small size but also by several morphological diagnostic characters commonly used in the description of *Pandinus* species, like trichobothrial pattern, pectinal tooth count, granulation and morphometric values. The new taxon described here raises the number of currently recognized species for the genus *Pandinus* to five and the number of known scorpion species in Burkina Faso to eight. To our knowledge, it is also the northernmost recorded location for the *Pandinus* genus in West Africa.

Methods

Illustrations and measurements were made with the aid of a Motic SMZ-1713 stereo-microscope with an ocular micrometer, together with a digital camera Tucsen HD Lite, a Canon EOS 7D camera and a Wacom Intuos drawing tablet. Maps were made using Google Maps, schoolmouv.fr and Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Hjelle (1990). Specimens studied herein are deposited in the MHNL (Musée des Confluences (ex Natural History Museum of Lyon), Centre Louis Lortet, Lyon, France) and EYCP (Eric Ythier Private Collection, Romanèche-Thorins, France).

Composition of the genus *Pandinus* (in order of description)

- *Pandinus imperator* (C.L. Koch, 1841) (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Guinea, Liberia, Mali, Nigeria, Sierra Leone, Togo)
- *Pandinus gambiensis* Pocock, 1899 (Gambia, Guinea, Guinea-Bissau, Mali, Senegal)
- *Pandinus ugandaensis* Kovařík, 2011 (Uganda)
- *Pandinus ulderigoi* Rossi, 2014 (Central African Republic)
- *Pandinus sahelicus* **sp. n.** (Burkina Faso)



Figs. 1-4. *Pandinus sahelicus* **sp. n.**, habitus (dried specimens). 1-2. ♂ holotype. 1. dorsal aspect. 2. ventral aspect. 3-4. ♀ paratype. 3. dorsal aspect. 4. ventral aspect. (Scale bar: 5 cm).

Taxonomic treatment

Family **Scorpionidae** Latreille, 1802
Subfamily **Pandininae** Thorell, 1876
Genus ***Pandinus*** Thorell, 1876
Pandinus imperator (C.L. Koch, 1841)
(Figs. 5, 9-10, 13-14, Tabs. 2-5)

Diagnosis (emended; based on Vachon, 1967; Lourenço & Cloudsley-Thompson, 1996; Stockmann & Ythier, 2010; Kovařík, 2011; Rossi, 2014; Lourenço, 2014; Prendini, 2016; Holstein *et al*., 2017, and the present study). Scorpions of moderate to large size with respect to the genus, with a total length of 107-230 mm. General colouration uniformly brownish to reddish black; legs and metasoma coloured as body; only telson slightly paler. Pectines with 15-19 teeth. Chela and telson without noticeable sexual dimorphism. Chela with 3 internal trichobothria dispersed in a straight line and of equal distance apart and with 9-14 ventral trichobothria; patella with 30 or more ventral trichobothria. Spiniform formula of tarsomere II = 4/3 : 4-5/3 : 4-5/2-3 : 4-5/2-3; tarsomere II with 2 spines on inclined anteroventral surface. Tergites and internal face of chela weakly to moderately granulated. Length to depth ratio of fourth metasomal segment higher than 2.

Pandinus sahelicus **sp. n.**
(Figs. 1-4, 6, 7-8, 11-12, 15-16, Tabs. 1-5)

Pandinus imperator: Prost, 1982: 7-8; Prendini, 2004: 255; Kovařík, 2011: 15; Rossi, 2014: 25; Rossi, 2015: 49; Prendini, 2016: 54.

Holotype ♂, Burkina Faso, Ouahigouya, X/1962 (A. Prost), deposited in the MHNL (47039705).

Paratypes (8 ex.), 5♂♂, 2♀♀, 1 immature ♀, Burkina Faso, Mouvielo (Diebougou), 12/IV/1978 (A. Prost), deposited in the MHNL (47039706 to 47039713).

Comparative material examined (15 ex.):
Pandinus imperator (C.L. Koch, 1841)
- Burkina Faso, Mahadaga, s/p Diapaga, 1♀, 1971 (A. Prost), MHNL (47039714);
- Burkina Faso, Banfora, 2♀♀, coll. date unknown (P. Lemoine), EYCP (EY0085);
- Côte d'Ivoire, Bémakaha (Korhogo), 1♂, 22/III/1976 (A. Prost), MHNL (47039715);
- Côte d'Ivoire, Région Korhogo, 1♀, coll. date unknown (A. Prost), MHNL (47039716);
- Côte d'Ivoire, Blekoum, Dt. Abengourou, 1♂, 24/III/1979 (A. Prost), MHNL (47039717);
- Côte d'Ivoire, Fétékro, 1♂, 20/IV/1977 (A. Prost), MHNL (47039718);
- Côte d'Ivoire, Mamorodougou (Odienné), 1♂, 20/IV/1977 (A. Prost), MHNL (47039719);
- Côte d'Ivoire, Sirakoro (Dabakala), 1♂, 23/IV/1976 (A. Prost), MHNL (47039720);
- Côte d'Ivoire, 1♂, coll. date unknown (A. Prost), MHNL (47039721);
- Togo, Tsévié, 1♀, coll. date unknown, EYCP (EY0517).

Pandinus gambiensis Pocock, 1899
- Senegal, 1♀, coll. date unknown (G. Favarel), MHNL (47023164).

Pandinus ulderigoi Rossi, 2014
- Central African Republic, 1♀, 1971 (G. Chavanon), MHNL (47036263).

Pandinopsis dictator (Pocock, 1888)
- Gabon, 1♂, VI/1965 (Boué), MHNL (47000885);
- Gabon, Sette Cama, 1♀, 28/XII/1969 (M. Patry), MHNL (47037910).

Figs. 5-6. Adult ♂ of two *Pandinus* species, habitus, dorsal aspect (dried specimens). 5. *Pandinus imperator*, medium size specimen from Blekoum, Côte d'Ivoire (155 mm). 6. *Pandinus sahelicus* **sp. n.**, largest specimen from the paratype series (89 mm). (Scale bar: 5 cm).

Etymology. The specific name refers to the distribution of the new species, occurring in an area between the Sahelian and Sudano-Sahelian zones.

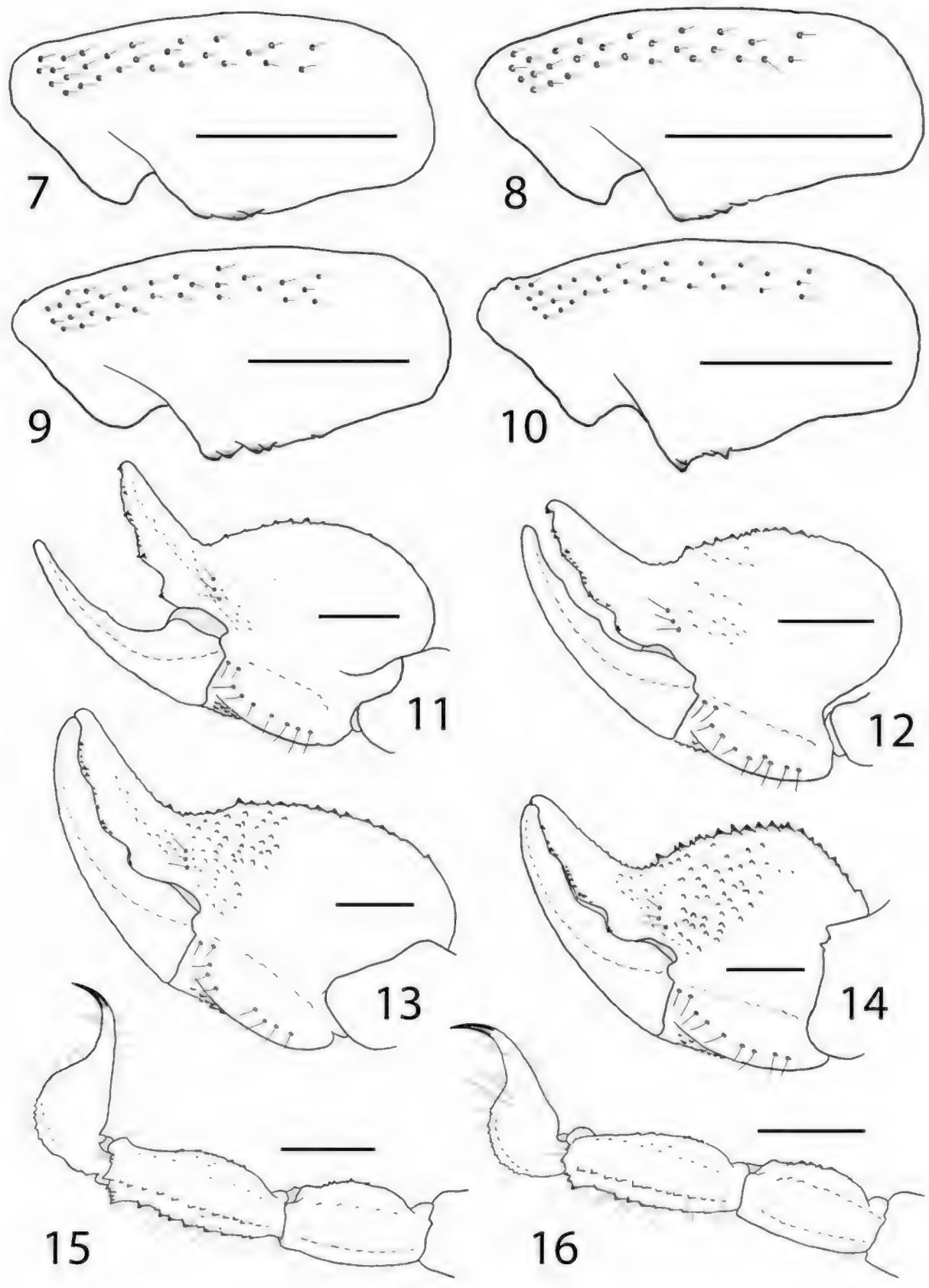
Diagnosis. Scorpions of small size with respect to the genus, with a total length of 73-89 mm in male and 75-83 mm in female. General colouration brownish to reddish black; legs and metasoma coloured as body; telson and chela manus paler. Pectinal tooth count 13-16 in male, 13-15 in female. Chela and telson without noticeable sexual dimorphism. Chela with 3 internal trichobothria dispersed in a straight line and of equal distance apart and with 9-11 ventral trichobothria; patella with 25-29 ventral trichobothria. Spiniform formula of tarsomere II = 3-4/2-3 : 4/2-3 : 4/2-3 : 4/2-3; tarsomere II with 2 spines on inclined anteroventral surface. Tergites and internal face of chela smooth to weakly granulated. Length to depth ratio of fourth metasomal segment 1.69-1.86.

Description (based on holotype and paratypes; morphometric values are presented in Table 1).

Colouration. basically brownish to reddish black. Prosoma: carapace brownish to reddish black with some darker pigmentation around the eyes. Mesosoma: tergites brownish to reddish black with the posterior edge slighter paler. Sternites yellowish brown to reddish brown; coxapophysis and sternum reddish-yellow; genital operculum and pectines dark yellow. Metasoma: all segments brownish to reddish black with some darker pigmentation over carinae; telson vesicle yellowish brown to reddish brown, paler than metasoma; aculeus reddish at the base and blackish at the extremity. Chelicerae brownish to reddish brown with some variegated darker spots; fingers brownish to reddish brown with dark reddish teeth. Pedipalps brownish to reddish black; chela manus paler, yellowish brown to reddish brown. Legs brownish to reddish black with tarsomere II slightly paler.

Morphology. Prosoma: carapace acarinate, almost smooth with a few minute granulations on lateral zones; posterior furrows strongly marked; anterior margin with a strongly pronounced concavity; median ocular tubercle slightly posterior to the centre of the carapace (distance ratio from posterior margin 0.44-0.47, from anterior margin 0.53-0.56); three pairs of lateral eyes of almost equal size. Mesosoma: tergites almost acarinate, smooth and shiny, with only a few minute granulations on lateral zones, especially on VII. Sternum pentagonal, slightly higher than wide. Genital operculum divided longitudinally, each plate with a semi-triangular shape, slightly lobate posteriorly in female. Pectinal tooth count 13-16 in male (14-14 in holotype), 13-15 in female (see variation in Table 2); fulcra strongly developed, with numerous setae. Sternites smooth and shiny, with two longitudinal parallel furrows on III to V; spiracles linear and conspicuous. Metasomal segments with moderately to strongly marked carinae; segment I-IV with eight complete carinae, V with five complete carinae and a short row of granules laterally forming incomplete carinae; granulation becomes spiniform on dorsal carinae of segments II to V; ventral and latero-ventral carinae intensely spinoid on V; all intercarinal spaces almost smooth, with only a few solitary granules; length to depth ratio of fourth metasomal segment 1.69-1.86 (see variation in Table 3); telson bulbous and moderately granular with four ventral carinae formed by spinoid granules; aculeus slightly shorter than the vesicle and moderately curved. Cheliceral dentition as defined by Vachon (1963) for the family Scorpionidae; movable finger with one subdistal tooth, and weakly marked basal teeth. Pedipalps: femur with four carinae, almost complete; patella with dorsal carina almost complete; chela with moderately marked ventral carinae; other carinae inconspicuous; chela manus strongly granular dorso-externally, almost smooth internally with only few solitary granules in female; chela fixed and movable fingers with

5 and 6 rows of granules, respectively, separated by larger granules. Legs smooth, without carinae and granules; tarsomere II with two spines on the inclined anteroventral surface; spiniform formula 3-4/2-3 : 4/2-3 : 4/2-3 : 4/2-3 (see variation in Table 4). Trichobothriotaxy: trichobothrial pattern of Type C, neobothriotaxic 'majorante' as defined by Vachon (1974); chela with 3 internal trichobothria dispersed in a straight line and of equal distance apart and with 9-11 ventral trichobothria; patella with 25-29 ventral trichobothria (see variation in Table 5).



Figs. 7-14. Trichobothrial pattern of *Pandinus sahelicus* **sp. n.** and *Pandinus imperator*. 7-10. Patella, ventral aspect. 7-8. *P. sahelicus* **sp. n.** 7. ♂ holotype. 8. ♀ paratype. 9-10. *P. imperator*. 9. ♂ from Bémakaha (Korhogo), Côte d'Ivoire. 10. ♀ from Magadaga, Burkina Faso. 11-14. Chela, ventro-internal aspect. 11-12. *P. sahelicus* **sp. n.** 11. ♂ holotype. 12. ♀ paratype. 13-14. *P. imperator*. 13. ♂ from Bémakaha (Korhogo), Côte d'Ivoire. 14. ♀ from Magadaga, Burkina Faso. (Scale bars: 5 mm).

Figs. 15-16. *Pandinus sahelicus* **sp. n.**, metasomal segments IV-V and telson, lateral aspect. 15. ♂ holotype. 16. ♀ paratype. (Scale bars: 5 mm).

Comparisons. *Pandinus sahelicus* **sp. n.** shows unquestionable similarities with *Pandinus imperator* in respect to several characters. However, it can be distinguished notably by the following main features:
(i) length to depth ratio of fourth metasomal segment 1.69-1.86 with average 1.76 in male and 1.83 in female (>2 in *P. imperator*, with average 2.27 in male and 2.17 in female among specimens examined in this study);
(ii) pedipalp patella with 25-29 ventral trichobothria with average 26.75 (30 or more in *P. imperator*, with average 30.44 among specimens examined in this study);
(iii) pectinal tooth count 13-16 with average 14.30 in male and 14.0 in female (15-19 teeth in *P. imperator*, with average 16.45 in male and 15.20 in female among specimens examined in this study);
(iv) generally lower tarsomere II spiniform formula with 3-4/2-3 : 4/2-3 : 4/2-3 : 4/2-3 and average 3.67/2.67 : 4.0/2.67 : 4.0/2.67 : 4.0/2.50 (4/3 : 4-5/3 : 4-5/2-3 : 4-5/2-3 in *P. imperator*, with average 4.0/3.0 : 4.25/3.0 : 4.75/3.0 : 4.92/3.0 among specimens examined in this study);
(v) tergites and internal face of pedipalp chela smooth to weakly granulated (weakly to moderately granulated in *P. imperator*);
(vi) pedipalp chela manus paler than body (coloured as body in *P. imperator*);
(vii) smaller size with a total length of 73-89 mm (107-230 mm in *P. imperator*). It is to be noted that the size of *P. imperator* is very variable depending on environment (Lourenço & Cloudsley-Thompson, 1999), this species showing a north-south cline in body size associated with aridity gradient, with specimens in the arid north on average smaller than those in the humid south (Prendini, 2016). This character should then be considered with cautious. However, in this study we have examined a *P. imperator* specimen from the semi-arid zone of eastern Burkina Faso (Mahadaga) presenting a very small size (107 mm), which reduces the known smaller recorded size for this species. *P. sahelicus* **sp. n.** still presents a much smaller size.

P. sahelicus **sp. n.** can also be easily distinguished from the three other *Pandinus* species notably by the following main features, in addition to allopatric geographic distributions (Figs. 17-18):
- *P. gambiensis* (Gambia, Guinea, Guinea-Bissau, Mali, Senegal) has three spines on the inclined anteroventral surface (two spines in the new species), internal trichobothria of chela with the most basal (*ib*) separated from the two others (*it*, *ist*) by twice or more the distance separating these two (trichobothria of equal distance apart in the new species) and a larger size with 130-200 mm (73-89 mm in the new species);
- *P. ulderigoi* (Central African Republic) has internal trichobothria of chela with the most basal (*ib*) separated from the two others (*it*, *ist*) by twice or more the distance separating these two (trichobothria of equal distance apart in the new species), metasomal segment V deeper than wide (wider than deep in the new species) and a larger size with 125-145 mm (73-89 mm in the new species);
- *P. ugandaensis* (Uganda) has external surface of chela smooth (granulated in the new species), a lower pectinal tooth count in female with 10-13 teeth (13-15 in the new species) and a larger size with 90-110 mm (73-89 mm in the new species).

Distribution and ecology

The new species is known from the semi-arid to dry Sahelian wooded steppes of Burkina Faso, in an area between the Sahelian and Sudano-Sahelian zones. The holotype was collected in Ouahigouya (Yatenga province) in the northern semi-arid Sahelian zone and the paratypes were collected in Mouvielo (Diebougou, Bougouriba Province) in the

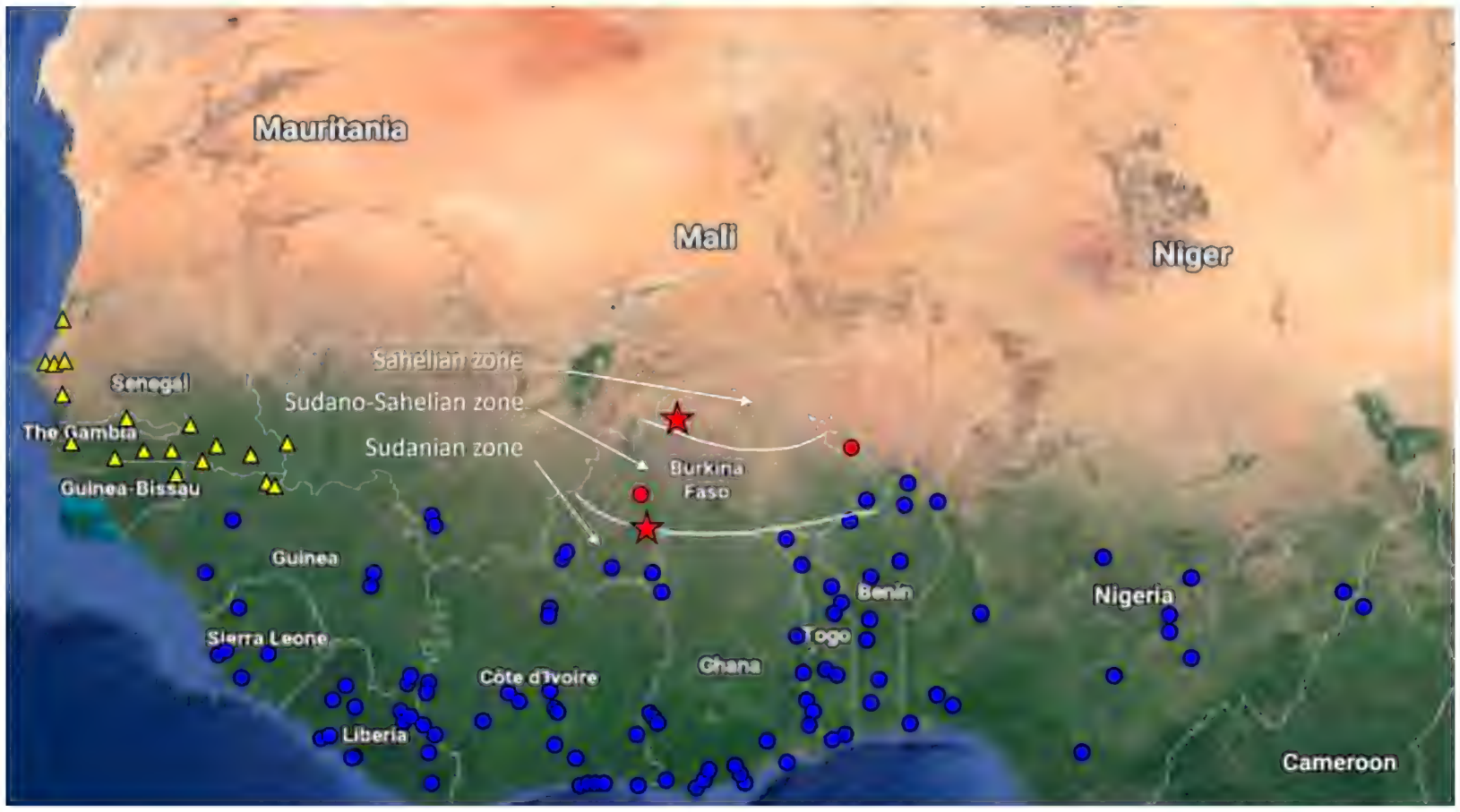


Fig. 17. Satellite map of Western Africa showing the known localities of the three *Pandinus* species occurring in the region: *P. gambiensis* (yellow triangle), *P. imperator* (blue circle) and *P. sahelicus* **sp. n.** (red star). Red circles represent records of *P. imperator* which might actually correspond to *P. sahelicus* **sp. n.** The Sahelian, Sudano-Sahelian, and Sudanian zones in Burkina Faso are indicated.

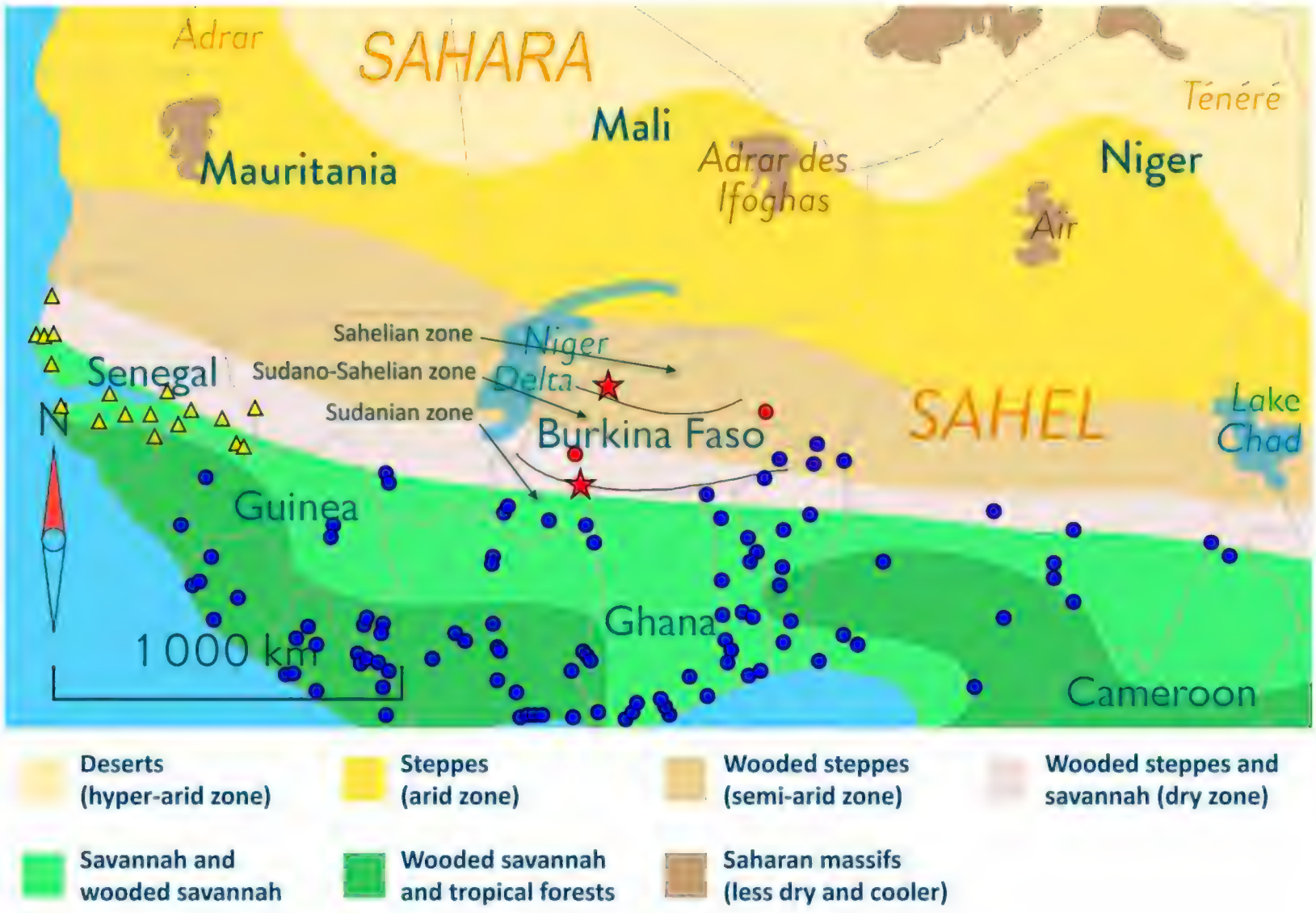


Fig. 18. Schematic map of Western Africa showing the main climatic zones and associated vegetation types, including the known localities of the three *Pandinus* species occurring in the region: *P. gambiensis* (yellow triangle), *P. imperator* (blue circle) and *P. sahelicus* **sp. n.** (red star). Red circles represent records of *P. imperator* which might actually correspond to *P. sahelicus* **sp. n.** The Sahelian, Sudano-Sahelian, and Sudanian zones in Burkina Faso are indicated.

central dry Sudano-Sahelian zone of the country. In this transitional area between the northern Sahelian steppes and the southern savannah formations, the vegetation is mainly composed by wooded steppes, with part these natural formations being replaced by agricultural activities. Based on the known distribution of *P. imperator* and the specimens examined in this study, the northern limit of this species in Burkina Faso seems to occur at the southern limit of the distribution of *P. sahelicus* **sp. n.** (with a potential sympatry area), *i.e.* approximately at the limit between the Sudanian and Sudano-Sahelian zones (Figs. 17-19). Two records of *P. imperator* from central western Burkina Faso (Prendini, 2004, 2016 – the latest record being from type location of *P. sahelicus* **sp. n.** and collected by same collector, A. Prost) and one record from southwestern Niger (Prost, 1982) probably correspond to the new species. The population from northern Benin and eastern Burkina Faso seems to correspond to *P. imperator*. To our knowledge, the holotype locality of the new species (Ouahigouya) is the northernmost recorded location for the *Pandinus* genus in West Africa.

Fig. 19. Sahelian wooded steppes in northern Burkina Faso, natural habitat of *Pandinus sahelicus* **sp. n.** (photo © Daniel Tiveau/CIFOR, https://www.cifor.org).

Identification key to species of the genus *Pandinus* Thorell, 1876

1. Tarsomere II with 3 spines on the inclined anteroventral surface ..... *P. gambiensis*
– Tarsomere II with 2 spines on the inclined anteroventral surface 2

2. Chela internal trichobothria with the most basal (*ib*) separated from the two others (*it*, *ist*) by twice or more the distance which separate these two ..... *P. ulderigoi*
– Chela internal trichobothria of equal distance apart 3

3. Metasomal segment IV length to depth ratio higher than 2; pectinal tooth count 15-19; total length 107-230 mm ..... *P. imperator*

– Metasomal segment IV length to depth ratio lower than 2; pectinal tooth count 10-16; total length 73-110 mm 4

4. External surface of chela smooth; metasomal segment IV length to depth ratio 1.6-1.7; female pectinal tooth count 10-13; total length 90-110 mm ..... *P. ugandaensis*
– External surface of chela granulated; metasomal segment IV length to depth ratio 1.7-1.9; female pectinal tooth count 13-15; total length 73-89 mm ..... *P. sahelicus* **sp. n.**

Table 1. Morphometric values (in mm) of the ♂ holotype and one ♀ paratype of *Pandinus sahelicus* **sp. n.** Abbreviations: length (L), width (W, corresponding to posterior width in carapace), depth (D).

	♂ holotype	♀ paratype
Total length (including telson)	87.15	83.14
Carapace (L - W)	14.75 - 13.75	14.88 - 13.75
Mesosoma (L)	22.63	24.00
Metasoma (L)	39.77	35.26
Metasomal segment I (L - W - D)	6.63 - 6.75 - 5.50	5.88 - 6.25 - 4.75
Metasomal segment II (L - W - D)	6.63 - 6.38 - 5.25	6.00 - 5.75 - 4.63
Metasomal segment III (L - W - D)	7.50 - 6.00 - 5.13	6.50 - 5.38 - 4.50
Metasomal segment IV (L - W - D)	8.38 - 5.25 - 4.75	7.50 - 4.75 - 4.13
Metasomal segment V (L - W - D)	10.63 - 4.63 - 4.13	9.38 - 4.13 - 3.88
Telson (L)	10.00	9.00
Vesicle (L - W - D)	5.88 - 5.13 - 4.63	5.00 - 4.38 - 3.75
Aculeus (L)	4.12	4.00
Pedipalp (L)	40.51	39.00
Pedipalp femur (L - W)	9.13 - 4.38	9.75 - 4.75
Pedipal patella (L - W)	10.50 - 5.25	10.00 - 5.00
Pedipal chela (L - W - D)	20.88 - 6.25 - 14.00	19.25 - 6.13 - 12.75
Movable finger (L)	13.13	13.00

Table 2. Pectinal tooth count variation in *Pandinus sahelicus* **sp. n.** (holotype underlined) and specimens of *Pandinus imperator* examined in this study. Abbreviations: number of pectines examined (N), standard deviation (SD).

Species	Sex	N	Pectinal tooth count					Average	SD
			13	14	15	16	17		
P. sahelicus **sp. n.**	♂	10	1	<u>6</u>	2	1		14.30	± 0.78
	♀	5	1	3	1			14.00	± 0.63
P. imperator	♂	11			1	4	6	16.45	± 0.66
	♀	8			8	2		15.20	± 0.40

Table 3. Metasomal segment IV length to depth ratio variation in *Pandinus sahelicus* **sp. n.** (holotype underlined) and specimens of *Pandinus imperator* examined in this study. Abbreviations: number of specimens examined (N), length (L), depth (D), standard deviation (SD).

Species	Sex	N	Metasomal segment IV L/D						Average	SD
P. sahelicus **sp. n.**	♂	6	1.69	1.69	1.76	1.78	1.79	1.86	1.76	± 0.06
	♀	2	1.82	1.84					1.83	± 0.01
P. imperator	♂	6	2.16	2.16	2.24	2.27	2.34	2.42	2.27	± 0.09
	♀	5	2.09	2.13	2.13	2.31	2.33		2.17	± 0.09

Table 4. Tarsomere II spiniform formula variation in *Pandinus sahelicus* **sp. n.** (holotype underlined) and specimens of *Pandinus imperator* examined in this study. Abbreviations: number of legs examined (N), internal (int.), external (ext.), standard deviation (SD).

Species	Leg	Side	N	Spine count				Average	SD
				2	3	4	5		
P. sahelicus **sp. n.**	I	int.	6		2	4		3.67	± 0.47
		ext.	6	2	4			2.67	± 0.47
	II	int.	6			6		4.00	± 0.00
		ext.	6	2	4			2.67	± 0.47
	III	int.	6			6		4.00	± 0.00
		ext.	6	2	4			2.67	± 0.47
	IV	int.	6			6		4.00	± 0.00
		ext.	6	3	3			2.50	± 0.50
P. imperator	I	int.	12			12		4.00	± 0.00
		ext.	12		12			3.00	± 0.00
	II	int.	12			9	3	4.25	± 0.43
		ext.	12		12			3.00	± 0.00
	III	int.	12			3	9	4.75	± 0.43
		ext.	12		12			3.00	± 0.00
	IV	int.	12			1	11	4.92	± 0.28
		ext.	12		12			3.00	± 0.00

Table 5. Patella ventral trichobothria count variation in *Pandinus sahelicus* **sp. n.** (holotype underlined) and specimens of *Pandinus imperator* examined in this study. Abbreviations: number of patella examined (N), standard deviation (SD).

Species	N	Patella ventral trichobothria count								Average	SD
		25	26	27	28	29	30	31	32		
P. sahelicus **sp. n.**	16	4	1	7	3	1				26.75	± 1.20
P. imperator	16						12	1	3	30.44	± 0.79

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***Pandinus sahelicus* Ythier & Audibert, 2023**
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Ozyptila rigida (O. Pickard-Cambridge, 1872), a new crab spider record from Türkiye (Araneae: Thomisidae)

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Abstract

This short paper reports a thomisid species which is new for the Turkish araneofauna. The characteristic features and photographs of *Ozyptila rigida* (O. Pickard-Cambridge, 1872) are presented in addition to its distribution map.

Keywords: Araneae, Thomisidae, *Ozyptila rigida*, new record, Türkiye.

Introduction

A total of 2169 species in 171 genera have been identified in the family Thomisidae Sundevall, 1833 all over the world (World Spider Catalog, 2023). Within this family, genus *Ozyptila* Simon, 1864 is represented by 101 species and 4 subspecies. In Europe, this genus is represented by 51 species (Nentwig *et al.*, 2023). According to the latest online checklist, family Thomisidae is represented by 92 species, of 16 genera, in Türkiye, 13 of them belong to genus *Ozyptila* (Demir & Seyyar, 2017; Danışman *et al.*, 2023). This paper deals with the characteristic features and distribution of *Ozyptila rigida* (O. Pickard-Cambridge, 1872) adding a new species to the araneofauna of Türkiye.

Material and Methods

Specimens were found under stones and collected during the day by hand aspirator. All the specimens are preserved in 70% ethanol and are deposited in the collection of the

Arachnological Museum of Kırıkkale University (KUAM). Pictures were taken using a Leica S8APO microscope by means of a Canon 250D camera. Images were montaged using "Combine-ZM" image stacking software and "Photoshop CS5" image editing software. All measurements are expressed in millimetres. Leg measurements are shown in the following order: femur, patella, tibia, metatarsus, tarsus, total length. Identification depended on figures of Nentwig *et al.* (2023). The map of the record was prepared using SimpleMappr [https://www.simplemappr.net] (Shorthouse, 2010) (Fig. 1).

Fig. 1. Distribution map of *Ozyptila rigida* (O. Pickard-Cambridge, 1872) (red square) in Türkiye.

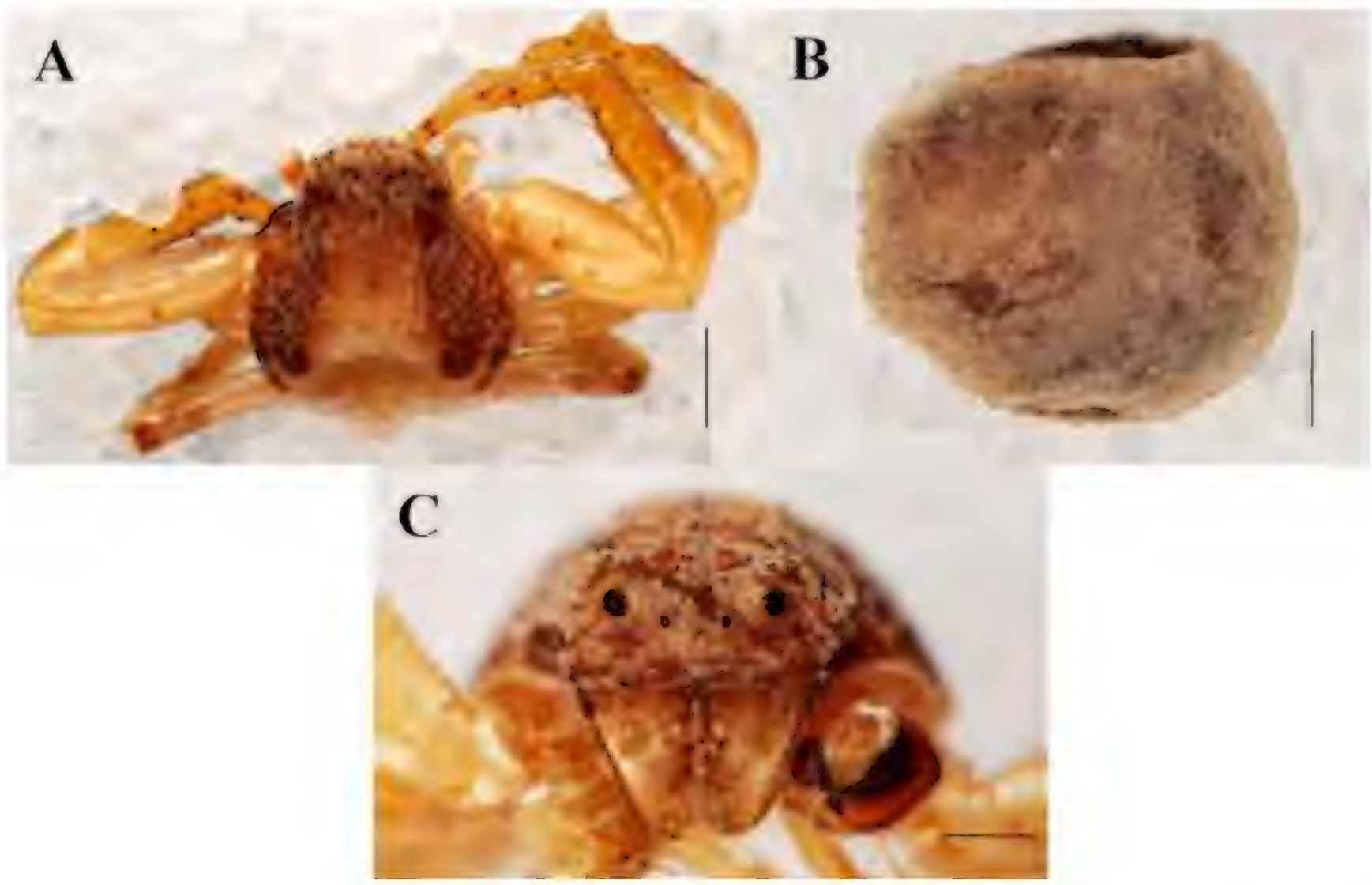

Fig. 2. *Ozyptila rigida* (O. Pickard-Cambridge, 1872), female, habitus. A. prosoma, dorsal view. B. abdomen, dorsal view. C. prosoma, frontal view. (Scale bar: 0.5 mm).

Results

Family **Thomisidae** Sundevall, 1833
Genus ***Ozyptila*** Simon, 1864
Ozyptila rigida (O. Pickard-Cambridge, 1872)

Material examined: 2♀♀, Türkiye, Adıyaman Province, Gerger District, (38°03'02"N, 39°07'18"E), 1015 m, 27.05.2021, Leg. İ. Coşar and T. Danışman, under stones.

Distribution: Russia (Caucasus), Azerbaijan, Cyprus, Israel, Saudi Arabia (World Spider Catalog, 2023).

Female. Measurements: Total length 5.0. Prosoma length 2.0, width 2.10. Abdomen length 3.0, width 2.60. Ocular area length 0.80. Chelicerae length 0.70, width 0.50. Sternum length 0.90, width 0.70. Lengths of legs: I. 2.0, 0.9, 1.2, 1.0, 0.7, Total 5.8; II. 1.7, 0.8, 1.2, 1.0, 0.6, Total 5.3; III. 1.2, 0.5, 0.7, 0.6, 0.5, Total 3.5; IV. 1.2, 0.5, 0.9, 0.7, 0.6, Total: 3.9. Leg formula I-II-IV-III. Prosoma brown, its median part is yellowish light brown and covered with light coloured hairs (Fig. 2A). Sternum yellow. Chelicerae yellowish brown (Fig. 2C). Legs I and II are light brown while the other legs are brown. Abdomen grey and covered with light hairs. (Fig. 2B). Epigyne and vulvae as in Fig. (3).

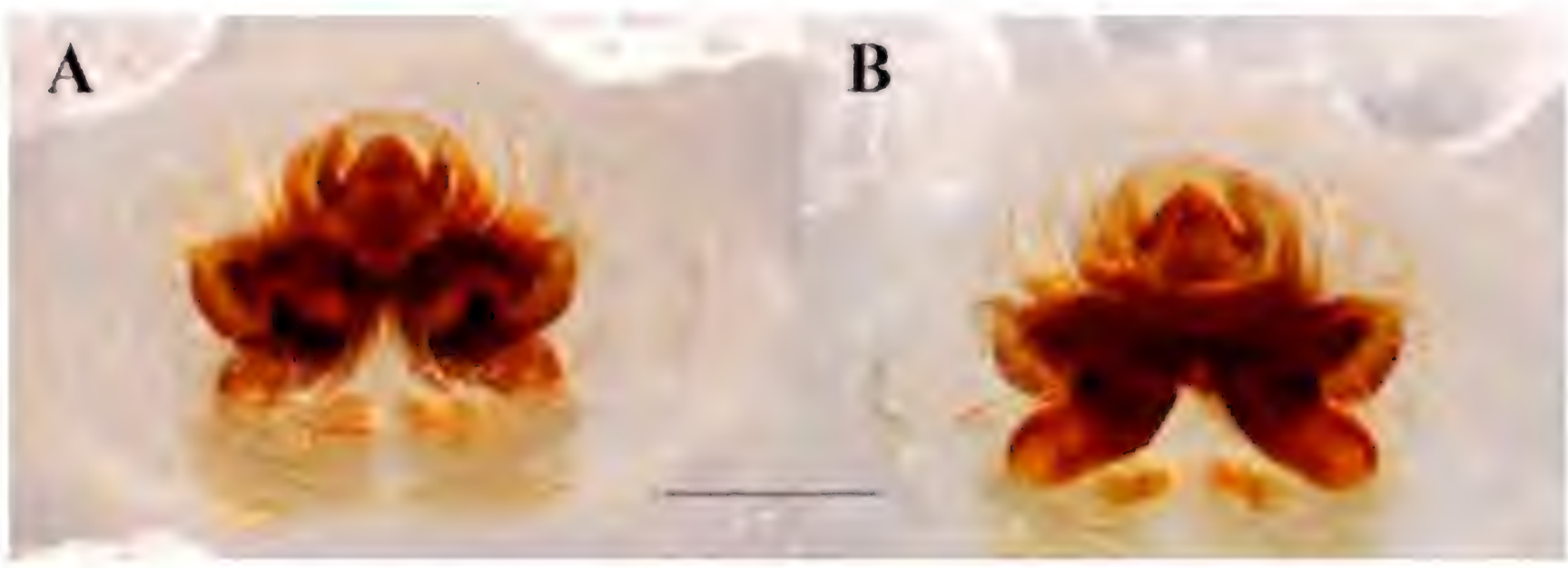

Fig. 3. *Ozyptila rigida* (O. Pickard-Cambridge, 1872), female. A. epigyne, ventral view. B. vulvae, dorsal view. (Scale bar: 0.5 mm).

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Walckenaeria plumata Millidge, 1979 (Araneae: Linyphiidae) in Türkiye

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Abstract

Walckenaeria plumata Millidge, 1979 of family Linyphiidae is recorded from Türkiye for the first time. Its characteristic features and photographs are presented in addition to their distribution map.

Keywords: Araneae, Linyphiidae, *Walckenaeria plumata*, new record, Türkiye.

Introduction

In family Linyphiidae Blackwall, 1859, 4839 species in 636 genera have been identified in the world; among them genus *Walckenaeria* Blackwall, 1833 includes 197 extant species and 2 subspecies distributed across the globe (World Spider Catalog, 2023).

In Türkiye, ten species are presently included in the genus *Walckenaeria*: *W. abantensis* Wunderlich, 1995, *W. aksoyi* Seyyar, Demir & Türkeş, 2008, *W. alticeps* (Denis, 1952), *W. antica* (Wider, 1834), *W. atrotibialis* (O. Pickard-Cambridge, 1878), *W. cirriceps* Thaler, 1996, *W. corniculans* (O. Pickard-Cambridge, 1875), *W. dysderoides* (Wider, 1834), *W. furcillata* (Menge, 1869), *W. stylifrons* (O. Pickard-Cambridge, 1875) (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2023).

Two male specimens of *Walckenaeria plumata* Millidge, 1979 were found in Kahramanmaraş Province. Its presence represents the easternmost boundary of this species and its second record in the world. This new record increases the known Turkish

linyphiid fauna to 155 species in 74 genera (Demir & Seyyar, 2017; Danışman *et al.*, 2023).

Material and Methods

Two specimens were collected from Kahramanmaraş Province of Türkiye during the day by hand aspirator. Identification depended on the works of Millidge (1979) and Nentwig *et al.* (2023). The specimens are preserved in 70% ethanol and are deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM). Images were taken using a Leica S8APO microscope by means of a Canon 250D camera, montaged using "Combine-ZM" image stacking software and "Photoshop CS5" image editing software. All measurements are in millimetres. Leg measurements are shown in the following order: femur, patella, tibia, metatarsus, tarsus, total length. The map of the record was prepared using SimpleMappr [https://www.simplemappr.net] (Shorthouse, 2010) (Fig. 3).

Results

Taxonomy

Family **Linyphiidae** Blackwall, 1859
Genus ***Walckenaeria*** Blackwall, 1833
Walckenaeria plumata Millidge, 1979 (Figs. 1-2)

Material examined: 2♂♂, Kahramanmaraş Province, Göksun District, Taşoluk Village (37°58'22"N, 36°26'33"E), 1483 m, 11.09.2020, Leg. T. Danışman and İ. Coşar.

Fig. 1. *Walckenaeria plumata* Millidge, 1979. Male, habitus. A. dorsal view. B. ventral view. C. lateral view. D. ocular area, frontal view. (Scale bar: 0.5 mm).

Male description. Total length 2.45. Prosoma 1.15 long, 0.80 wide. Opisthosoma 1.30 long, 0.90 wide. Ocular area 0.40 long. Sternum 0.60 long, 0.60 wide, Chelicerae 0.35 long, 0.20 wide. Prosoma orange to light brown, with a tuft of plumose hairs between anterior and posterior median eyes. Sternum orange. Opisthosoma grey to sepia (Figs. 1A-C). Chelicerae light brown (Fig. 1D). Legs yellow. Male palpal tibia with multiple

apophyses. Pedipalp characteristic as in Fig. (2). Lengths of legs: I 0.95, 0.25, 0.95, 0.75, 0.50, Total 3.40; II 0.95, 0.25, 0.90, 0.70, 0.45, Total 3.25; III 0.75, 0.25, 0.65, 0.65, 0.45, Total 2.75; IV 1.0, 0.20, 0.95, 0.90, 0.50, Total: 3.55. Leg formula IV-I-II-III.

Distribution: Italy (World Spider Catalog, 2023).

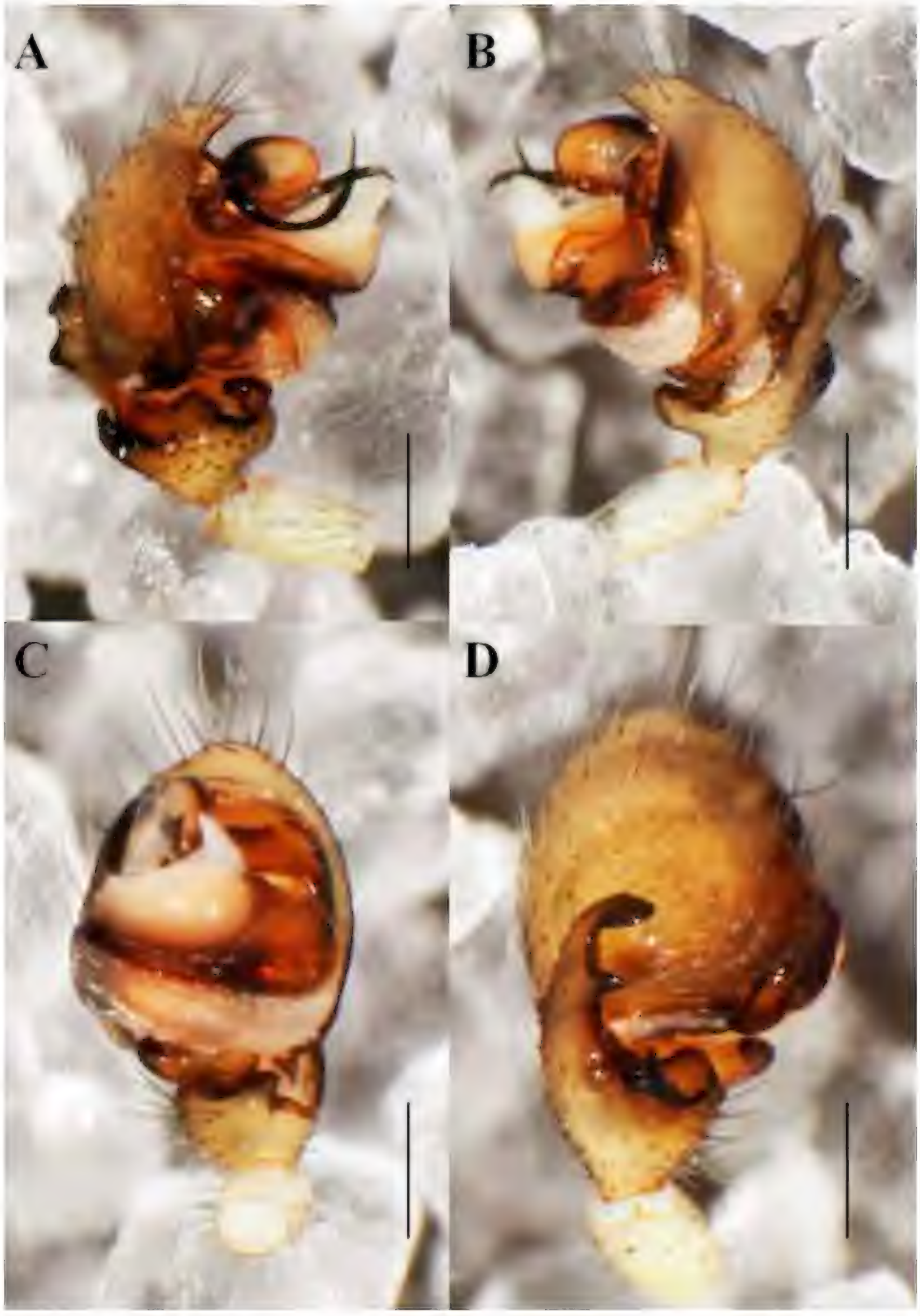

Fig. 2. *Walckenaeria plumata* Millidge, 1979. Male palp. A-B. lateral views. C. ventral view. D. palpal tibia, dorsal view. (Scale bar: 0.2 mm).

Fig. 3. Distribution map of *Walckenaeria plumata* Millidge, 1979 (black star) in Türkiye.

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Loxosceles rufescens (Dufour, 1820) in Jordan (Araneae: Sicariidae), with updated list of the known records of spiders from Jordan

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Abstract

Loxosceles rufescens (Dufour, 1820) of family Sicariidae is recorded from Jordan for the first time. Only one adult male specimen of this species was collected in November 2011 inside a house in Amman, Jordan. This is the first record of family Sicariidae too. Its illustrations and measurements are presented.

An updated list of the known records of spiders from Jordan is presented too. The list includes 17 families, 31 genera, and 36 species of spiders in Jordan.

Keywords: Araneae, Sicariidae, *Loxosceles rufescens*, Jordan.

Introduction

Family Sicariidae Keyserling, 1880 is a small family of 172 species in 3 genera: *Hexophthalma* Karsch, 1879 [8 spp.], *Loxosceles* Heineken & Lowe, 1832 [143 spp.], and *Sicarius* Walckenaer, 1847 [21 spp.] (World Spider Catalog, 2023).

The 143 species of genus *Loxosceles* are worldwide distributed: Africa, Asia, North and South America, Australia, Southern Europe, and Finland (Introduced) (World Spider Catalog, 2023).

The type species of genus *Loxosceles* is *Loxosceles rufescens* (Dufour, 1820) described as *Scytodes rufescens* by Léon Dufour (Dufour, 1820: 203-204, pl. 76, f. 5) from the Kingdom of Valencia, Spain and *Loxosceles citigrada* by Heineken & Lowe (in Lowe, 1832: 322-323, pl. 48, f. 1-4, 6-7, 9, 11-14) from Madeira, Portugal.

Diagnostic and descriptive characters of family Sicariidae, subfamily Loxoscelinae "Violin spiders"

Diagnostic characters

Medium-sized to large araneomorph spiders (8-19 mm); leg with two tarsal claws; ecribellate; haplogyne; with six eyes in three diads in a recurved row; semichelate chelicera provided with a stridulating file.

Descriptive characters

Colour: yellowish or reddish brown with contrasting darker markings. Carapace: flat, longer than wide with a conspicuous, deeply impressed fovea and porrect clypeus. Sternum: longer than wide. Chelicerae: joined basally; laminate; without condyle; outer surface with stridulating file which is scraped by peg-like processes on inner surface of palpal femora; fangs short, more or less transverse. Labium longer than wide; endites long, converging around labium. Legs: with several serrated bristles borne on a small onychium; legs clothed in sickle-shaped setae; legs long and slender. Female palp: without claw. Abdomen: markedly depressed; clothed in barbed spine-like setae. Spinnerets: colulus conspicuous, pointed, bearing setae; spinnerets medium-sized, contiguous; anterior and posterior pairs long, two-segmented; with single, ridged, major ampullate gland spigot on anterior lateral spinnerets; a row of modified setae on posterior lateral spinnerets in both sexes. Respiratory system: two booklungs; posterior respiratory organs open through single transverse spiracle in front of spinnerets. Genitalia: female genitalia with single broad opening; vulva paired; male palp with tarsus and bulb small; embolus with conical base, slender and spiniform distally; no conductor.

Lifestyle: Ground-dwelling, wandering spiders (Jocqué & Dippenaar-Schoeman, 2006).

Fig. 1. *Loxosceles rufescens* (Dufour, 1820), ♂ from Amman, habitus, dorsal view.

Abbreviations used: ACE = Arachnid Collection of Egypt, AL = abdomen length, CL = carapace length, CW = carapace width, TL = total length.

All measurements are in millimetres (mm).

Fig. 2. *Loxosceles rufescens* (Dufour, 1820), ♂ from Amman, cephalothorax, dorsal view.

Family **Sicariidae** Keyserling, 1880

Genus ***Loxosceles*** Heineken & Lowe, 1832

Loxosceles rufescens (Dufour, 1820)

Figs. 1-4.

World Distribution: Southern Europe (Albania, Croatia, Cyprus, Czechia, France / Corsica, Greece / Crete, Italy / Sardinia-Sicily, Malta, Netherlands, Portugal, Spain / Balearic Islands, Switzerland), northern Africa (Algeria, Egypt, Libya, Morocco, Tunisia) to Asia (Turkey, Iran, Afghanistan). Introduced to USA, Mexico, Peru, Macaronesia, South Africa, India, China, Japan, Korea, Laos, Thailand, Australia, Hawaii (World Spider Catalog, 2023; Nentwig *et al.*, 2023).

Material examined. Jordan, 1♂, Abu Nseir, north of Amman (32°03'17.4"N, 35°52'57.3"E elev. 1026 m), 6 November 2011, walking on the ground of the bathroom of a house, leg. Hisham K. El-Hennawy [ACE.2011.11.06.AR.001.JOR].

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Figs. 3-4. *Loxosceles rufescens* (Dufour, 1820), ♂ palp.
3. retrolateral view. 4. prolateral view.

For the description of *Loxosceles rufescens*, see Dufour (1820: 203-204, pl. 76, f. 5, D♂) and Trivedi & Dal (2019: 2-5, f. 1a-h, 2a-f, D♂♀). For its synonyms see World Spider Catalog (2023).

Male habitus and cephalothorax, dorsal view (Figs. 1-2).

Measurements: ♂ TL 5.5, CL 2.7, CW 2.0 (thoracic region), AL 2.6.

Table 1. Measurements of leg segments of *Loxosceles rufescens* (♂).

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.7	0.9	5.4	5.7	1.4	17.1
II	3.5	0.9	6.4	6.9	1.4	19.1
III	3.4	0.9	4.6	5.3	1.2	15.4
IV	3.4	0.9	4.5	5.2	0.9	14.9

Male palpal organ: see Figs. (3-4).

Habitat: In dry habitats, under stones, rock crevices. Often in and around houses and buildings (Nentwig *et al.*, 2023).

Venomosity

The most venomous spiders in the world belong to five genera: "widow spiders (*Latrodectus* spp.), the recluse spiders (*Loxosceles* spp.), and two spiders confined to single countries: the Australian funnel web spider (*Atrax* and *Hadronyche* spp.) and the armed spider (*Phoneutria* spp.) from Brazil" (Isbister *et al.*, 2003).

The well-known American brown recluse spider *Loxosceles reclusa* Gertsch & Mulaik, 1940 is much feared and its bite causes local swelling as well as necrosis of the skin (Sams *et al.*, 2001).

Loxosceles rufescens is a circum-Mediterranean spider species, potentially harmful to humans. Its native area covers the Mediterranean Basin and Near East. Easily spread with transported goods, it is meanwhile an alien and invasive species to nearly all other continents and many islands. This species occurs in semiarid steppe-like habitats, typically under stones and in cavities, which enables it to settle inside buildings when invading the synanthropic environment. *L. rufescens* is a spider species globally spread by human activity, it rarely bites humans and the bites are less harmful than often described. There is no known fatal issue (Nentwig *et al.*, 2017).

Loxosceles rufescens spiders live hidden in crevices and cracks and are nocturnal. Even though *Loxosceles* species have a certain affinity for buildings, they live a very hidden life, are rarely seen and bites are very rare. The venom of *Loxosceles* is special among spiders because its main component, the enzyme sphingomyelinase D, causes tissue necrosis [i.e. cell death], which heals extremely poorly. As a second peculiarity, it must be mentioned that the bite itself does not cause pain, so it is not noticed by many people. Therefore, there is no reliable data on the actual frequency of bites. However, it is assumed that most bites cause no symptoms or only an insignificant swelling with slight itching and heal on their own. In the remaining cases, the venom causes constriction of the blood vessels around the site of the bite and the usual signs of inflammation become apparent. About 6 to 9 h after the bite, the wound begins to hurt, a blister develops, and later sloughing and wound necrosis set in. The necrosis heals on its own, but the healing process may take months and the affected area may become very large in serious cases, so it may be necessary to remove these areas surgically. In very rare cases, a spider bite causes a severe systemic reaction that can lead to multiple organ failure and death with destruction of red blood cells (haemolysis). The worldwide frequency of such deaths can only be roughly estimated and could be 1–3 per year.

Due to the typical skin changes that can occur after a *Loxosceles* bite, it should be easy to diagnose such a bite, even if no spider was observed. However, followup examinations have shown that up to 80% of such diagnoses are wrong and are based on a misinterpretation of, for example, bacterial infections such as those caused by Lyme disease, staphylococci, streptococci or various skin diseases. Verification of a spider bite is therefore necessary to avoid treatment errors. There is an antiserum against *Loxosceles* venom, but its efficacy is doubtful. This may have to do with the fact that most *Loxosceles* bites are not treated until the necrotic stage, when it is too late for such a measure (Nentwig *et al.*, 2022).

Spider species of Jordan according to known records

The following list of Jordanian spiders comprises the list of 2020 (El-Hennawy, 2020) [13 Families, 24 genera, 28 species] in addition to other records published during 2021-2023 (*) to raise the recorded taxa to: 17 Families, 31 genera, 36 species.

Family **Araneidae** Clerck, 1757

Argiope lobata (Pallas, 1772) * (El-Hennawy, 2023)

Family **Dysderidae** C.L. Koch, 1837

Dysdera lata Reuss, 1834 * (El-Hennawy, 2022b)

Family **Eresidae** C.L. Koch, 1845
Stegodyphus lineatus (Latreille, 1817)
Stegodyphus pacificus Pocock, 1900

Family **Gnaphosidae** Pocock, 1898
Haplodrassus mediterraneus Levy, 2004
Pterotricha dalmasi Fage, 1929
Zelotes scrutatus (O. Pickard-Cambridge, 1872)

Family **Linyphiidae** Blackwall, 1859
Alioranus pastoralis (O. Pickard-Cambridge, 1872)

Family **Liocranidae** Simon, 1897
Mesiotelus tenuissimus (L. Koch, 1866) * (El-Hennawy, 2022a)

Family **Lycosidae** Sundevall, 1833
Evippa praelongipes (O. Pickard-Cambridge, 1870)
Lycosa piochardi Simon, 1876 * (Armiach Steinpress *et al.*, 2022)

Family **Oecobiidae** Blackwall, 1862
Oecobius cellariorum (Dugès, 1836)
Uroctea hashemitorum Bosselaers, 1999

Family **Oxyopidae** Thorell, 1870
Oxyopes elifaz Levy, 2007

Family **Pholcidae** C.L. Koch, 1850
Artema nephilit Aharon, Huber & Gavish-Regev, 2017
Hoplopholcus cecconii Kulczyński, 1908

Family **Salticidae** Blackwall, 1841
Aelurillus gershomi Prószyński, 2000
Aelurillus nabataeus Prószyński, 2003
Cyrba algerina (Lucas, 1846)
Heliophanillus fulgens (O. Pickard-Cambridge, 1872)
Menemerus davidi Prószyński & Wesołowska, 1999
Mogrus logunovi Prószyński, 2000
Mogrus mirabilis Wesołowska & van Harten, 1994
Philaeus chrysops (Poda, 1761)
Synageles dalmaticus (Keyserling, 1863)

Family **Scytodidae** Blackwall, 1864
Scytodes kinzelbachi Wunderlich, 1995

Family **Sicariidae** Keyserling, 1880
Loxosceles rufescens (Dufour, 1820) * (Current record)

Family **Sparassidae** Bertkau, 1872
Cerbalus aravaensis Levy, 2007
Eusparassus walckenaeri (Audouin, 1825) * (El-Hennawy & Al-Saraireh, 2021)

Micrommata formosa Pavesi, 1878 * (El-Hennawy & Al-Saraireh, 2021)

Family **Theraphosidae** Thorell, 1869
Chaetopelma olivaceum (C.L. Koch, 1841)

Family **Theridiidae** Sundevall, 1833
Latrodectus pallidus O. Pickard-Cambridge, 1872
Latrodectus tredecimguttatus (Rossi, 1790) * (El-Hennawy *et al.*, 2022)

Family **Zodariidae** Thorell, 1881
Pax meadei (O. Pickard-Cambridge, 1872)
Zodarion lutipes (O. Pickard-Cambridge, 1872)
Zodarion nitidum (Savigny, 1825)

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